"VULCAN"
"AGRIPPA"

Wrenches

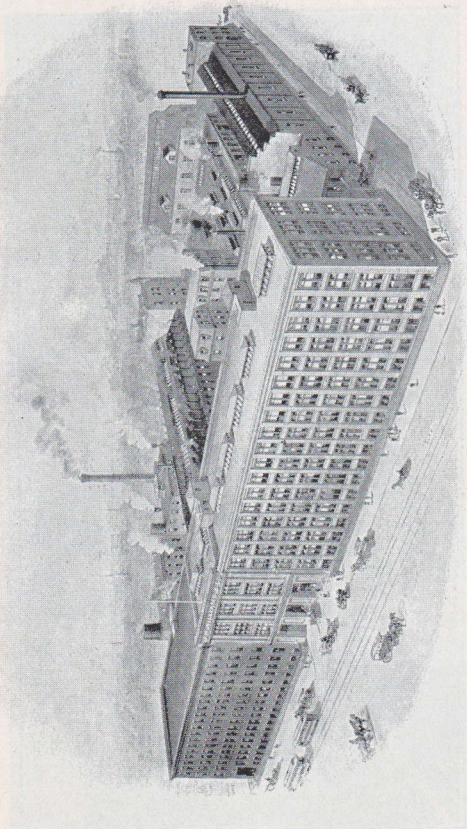


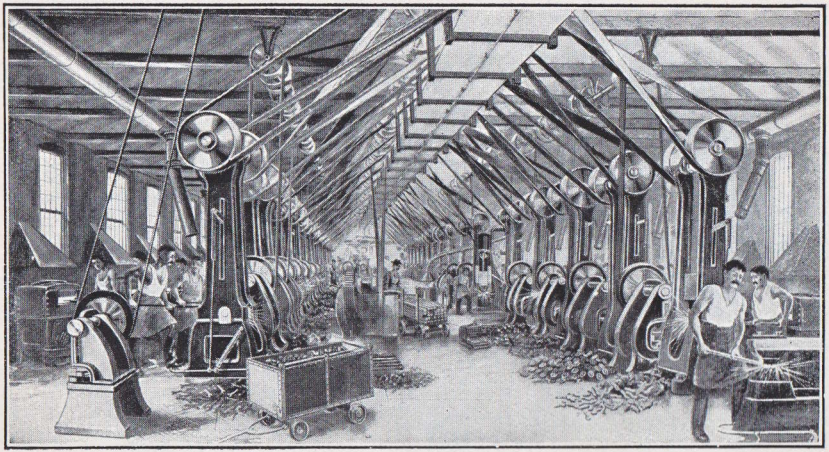
1912

J. H. WILLIAMS & CO.

SUPERIOR DROP-FORGINGS

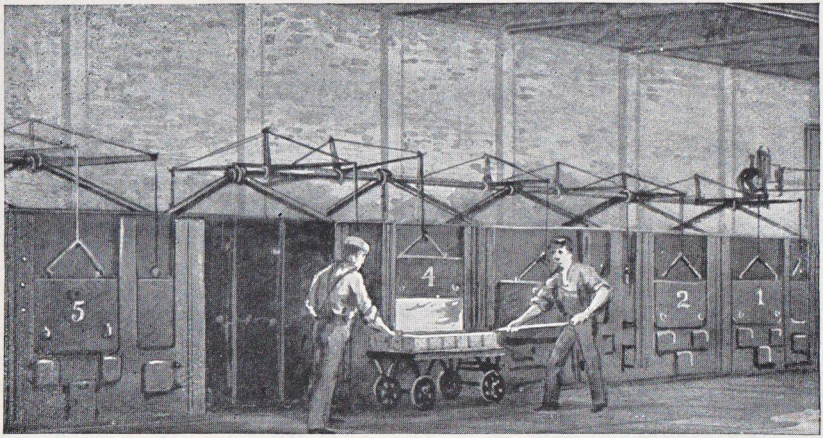
BROOKLYN, NEW YORK.





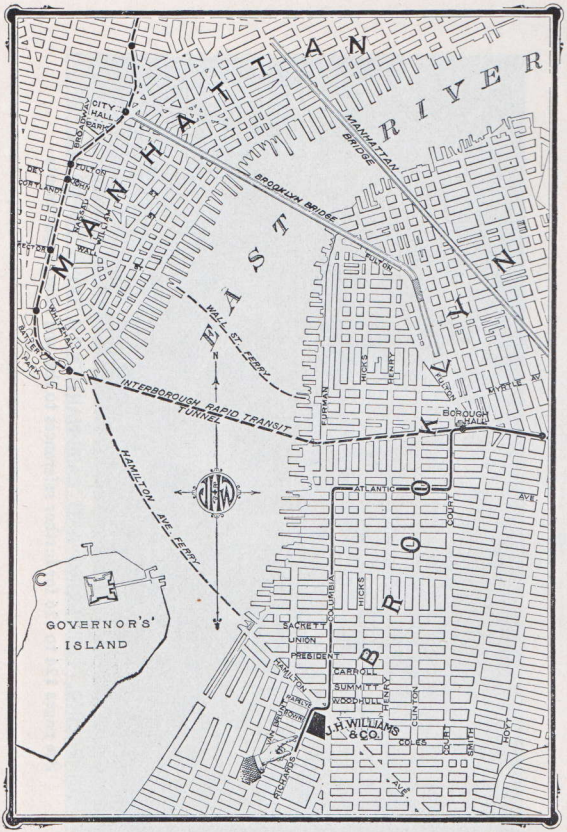
INTERIOR OF MAIN FORGE

See pages 119 to 123



ANNEALING, TEMPERING AND CASE-HARDENING DONE TO ORDER

See pages 124 to 126 for further references to this and allied departments



From New York: Take subway to Borough Hall, whence trolley car marked "Crosstown" and "Erie Basin" will follow heavy line above, passing directly by our factory

J. H. WILLIAMS & CO.

BROOKLYN, NEW YORK, U. S. A.

Manufacturers of

Iron, Steel, Copper, Bronze
and Aluminum

DROP-FORGINGS

"VULCAN"



"AGRIPPA"

Fifteenth Edition
April, 1912

OFFICE AND WORKS

150 Hamilton Ave. and Richards St.

Western Office: Chicago, Ill.
Export Office: 21 State St., New York City

Business Established, Jan. 1, 1883
Incorporated, July 1, 1895

A chart showing the best way to reach our factory is shown on the preceding page

Annealing, Tempering, Carbonizing and Case-Hardening Done to Order

Facilities of above departments are further referred to on pages 124 to 126.

Chemical Analyses

Our laboratory is thoroughly equipped and we offer its services for such analyzing as may be required. Methods of handling our standard materials are described on pages 126 and 127.

Electric Welding

We are prepared to electric-weld rounds up to and including 1 inch diameter and by this means can supply several of our stock specialties, such as Rod and Yoke Ends, with shanks of any reasonable length.

WE are sole makers of the "W" and "Vulcan" and "Agrippa" brands of drop-forged specialties and were first to establish a uniform line of fifteen degree angle Wrenches, since generally adopted.

Cuts

illustrating our goods are furnished for customers' catalogues; if desired we will prepare matter for printer and correct proof.

Estimates

furnished on receipt of model or drawing and specifications stating quantity required.

Terms, Cash

Payable in New York City par funds, with no allowance for exchange. All goods delivered on cars or boat, New York, without charge for packing or cartage.

Cable Address, "Willrich, Brooklyn"

Codes used: Western Union, Simplex, Lieber's Standard and "A B C", Fourth and Fifth Editions.

Wrenches

In this catalogue are listed about 800 assorted sizes of 40 patterns of Wrenches, with a range of openings for every size bolt from 1-8 inch to 5 inch, inclusive.

Changes

Alterations have been made in Numbering, Dimensions and Prices throughout several of our lines of standard drop-forged Wrenches and other Specialties as listed in this catalogue and it is therefore essential that all previous issues be destroyed. Duplicates of catalogue, in this or pocket-size, will be furnished upon request.

Additions

Many of our standard lines have been extended by the addition of several new sizes.

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For the convenience of customers in checking invoices, we include a numerical index of wrenches, affording a double means of locating a given catalogue page or establishing identities when numbers only are given in invoices.

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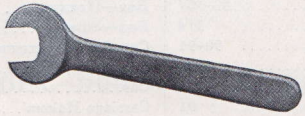
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Unfinished Wrench

forgings are milled only.



Semi-finished Wrench

forgings are milled, case-hardened (black) all over and have heads ground bright.



Finished Wrench

forgings are milled, polished all over; case-hardened (mottled) and lacquered—heads bright.



Stock Milling

All wrenches are milled somewhat larger than stated in tables to allow for proper clearance and variation.

Special Milling

to order, without extra charge in lots of 50 or more of a size. A sample nut or screw, as gauge, should accompany orders.

Special Wrenches

made to order. Prices will be quoted upon receipt of models or drawings and specifications stating kind of finish (see above description) and quantity required.

When Ordering

please use numbers and state whether Unfinished, Semi-finished or Finished Wrenches are desired.

Unless otherwise specified Finished Wrenches will be supplied.

ENGINEERS' WRENCHES

15° Angle, Single Head



In Stock with openings for U. S. Standard Finished Nuts; Whitworth Standard, Metric Measure or special openings milled to order. See opposite page for special conditions and various styles of finish.

The following Semi-finished and Finished Wrenches have hole in end of handle.

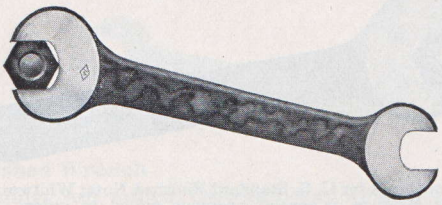
No.	17	18	19	19A	20	20A	21A	21B	21C	22A	22B
Hole	5/8	3/4	7/8	7/8	1	1	1 1/8	1 1/8	1 1/8	1 1/4	1 1/4

Wrenches of this style but with handle tapered will be furnished on orders for the larger sizes, beginning with No. 11. Tapered handle wrenches of smaller sizes and flared handle wrenches of larger sizes can also be furnished if ordered in quantities.

Number	For U. S. Standard Nut Size Bolt	Opening Milled	Extreme Length	Thickness Head	PRICE Unfinished	PRICE Semi finished	PRICE Finished	Number
00	**1/8**	5/16	3	5/32	$.08	$.12	$.16	**00**
0	**3/16**	13/32	3 1/2	3/16	.09	.13	.18	**0**
1	**1/4**	1/2	4	1/4	.10	.15	.20	**1**
2	**5/16**	19/32	4 3/4	9/32	.12	.18	.24	**2**
3	**3/8**	11/16	5 5/8	5/16	.14	.21	.28	**3**
4	**7/16**	25/32	6 1/2	11/32	.17	.25	.34	**4**
5	**1/2**	7/8	7 1/2	13/32	.20	.30	.40	**5**
6	**9/16**	31/32	8 3/8	7/16	.26	.39	.52	**6**
7	**5/8**	1 1/16	9 1/4	1/2	.32	.48	.64	**7**
8	**3/4**	1 1/4	11 1/8	9/16	.42	.63	.84	**8**
9	**7/8**	1 7/16	13	21/32	.58	.87	1.16	**9**
10	**1**	1 5/8	14 3/4	3/4	.75	1.13	1.50	**10**
11	**1 1/8**	1 13/16	16 1/2	27/32	1.00	1.50	2.00	**11**
12	**1 1/4**	2	18 1/2	29/32	1.25	1.88	2.50	**12**
13	**1 3/8**	2 3/16	20	1	1.62	2.43	3.24	**13**
14	**1 1/2**	2 3/8	22	1 1/16	2.00	3.00	4.00	**14**
15	**1 5/8**	2 9/16	24	1 1/8	2.50	3.75	5.00	**15**
16	**1 3/4**	2 3/4	25 1/2	1 7/32	3.00	4.50	6.00	**16**
16A	**1 7/8**	2 15/16	27	1 7/32	3.70	5.55	7.40	**16A**
17	**2**	3 1/8	29 1/2	1 3/8	4.40	6.60	8.80	**17**
18	**2 1/4**	3 1/2	33	1 17/32	6.00	9.00	12.00	**18**
19	**2 1/2**	3 7/8	37	1 5/8	7.60	11.40	15.20	**19**
19A	**2 3/4**	4 1/4	39	1 5/8	10.00	15.00	20.00	**19A**
20	**3**	4 5/8	41	1 7/8	13.00	19.50	26.00	**20**
20A	**3 1/4**	5	43	1 7/8	16.00	24.00	32.00	**20A**
21A	**3 1/2**	5 3/8	45	2 1/2	22.00	33.00	44.00	**21A**
21B	**3 3/4**	5 3/4	47	2 1/2	25.00	36.00	47.00	**21B**
21C	**4**	6 1/8	49	2 1/2	28.00	39.00	50.00	**21C**
22A	**4 1/2**	6 7/8	51	3	40.00	60.00	80.00	**22A**
22B	**5**	7 5/8	53	3	45.00	65.00	85.00	**22B**

ENGINEERS' WRENCHES

15° Angle, Double Head



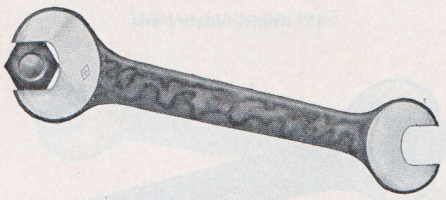
In Stock with openings for U. S. Standard Finished Nuts; Whitworth Standard, Metric Measure or special openings milled to order. See page 10 for special conditions, and various styles of finish.

For desirable selections of these Wrenches in Sets see pages 55 and 56.

Number	For U. S. Standard Nuts Size Bolts	Openings Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
21	**1/8 & 3/16**	5/16 & 13/32	3 1/2	3/16 & 3/16	$.12	$.18	$.24	**21**
22	**1/8 & 1/4**	5/16 & 1/2	4	3/16 & 1/4	.13	.20	.26	**22**
23	**3/16 & 1/4**	13/32 & 1/2	4	1/4 & 1/4	.14	.21	.28	**23**
24	**3/16 & 5/16**	13/32 & 19/32	4 7/8	1/4 & 9/32	.16	.24	.32	**24**
25	**1/4 & 5/16**	1/2 & 19/32	4 7/8	9/32 & 9/32	.18	.27	.36	**25**
26	**1/4 & 3/8**	1/2 & 11/16	5 7/8	9/32 & 5/16	.20	.30	.40	**26**
27	**5/16 & 3/8**	19/32 & 11/16	5 7/8	5/16 & 5/16	.22	.33	.44	**27**
28	**5/16 & 7/16**	19/32 & 25/32	6 7/8	5/16 & 11/32	.24	.36	.48	**28**
29	**3/8 & 7/16**	11/16 & 25/32	6 7/8	11/32 & 11/32	.26	.39	.52	**29**
30	**3/8 & 1/2**	11/16 & 7/8	7 3/4	11/32 & 13/32	.28	.42	.56	**30**
31	**7/16 & 1/2**	25/32 & 7/8	7 3/4	13/32 & 13/32	.30	.45	.60	**31**
32	**7/16 & 9/16**	25/32 & 31/32	8 3/4	13/32 & 7/16	.32	.48	.64	**32**
33	**1/2 & 9/16**	7/8 & 31/32	8 3/4	7/16 & 7/16	.36	.54	.72	**33**
34	**1/2 & 5/8**	7/8 & 1 1/16	9 3/4	7/16 & 1/2	.40	.60	.80	**34**
35	**9/16 & 5/8**	31/32 & 1 1/16	9 3/4	1/2 & 1/2	.44	.66	.88	**35**
36	**9/16 & 3/4**	31/32 & 1 1/4	11 1/2	1/2 & 9/16	.51	.77	1.02	**36**
37	**5/8 & 3/4**	1 1/16 & 1 1/4	11 1/2	9/16 & 9/16	.58	.87	1.16	**37**
38	**5/8 & 7/8**	1 1/16 & 1 7/16	13 1/2	9/16 & 21/32	.65	.98	1.30	**38**
39	**3/4 & 7/8**	1 1/4 & 1 7/16	13 1/2	21/32 & 21/32	.76	1.14	1.52	**39**
40	**3/4 & 1**	1 1/4 & 1 5/8	15 1/2	21/32 & 3/4	.88	1.32	1.76	**40**
41	**7/8 & 1**	1 7/16 & 1 5/8	15 1/2	3/4 & 3/4	1.00	1.50	2.00	**41**
42	**7/8 & 1 1/8**	1 7/16 & 1 13/16	17	3/4 & 27/32	1.18	1.77	2.36	**42**
43	**1 & 1 1/8**	1 5/8 & 1 13/16	17	27/32 & 27/32	1.36	2.04	2.72	**43**
44	**1 & 1 1/4**	1 5/8 & 2	19	27/32 & 29/32	1.55	2.33	3.10	**44**
45	**1 1/8 & 1 1/4**	1 13/16 & 2	19	29/32 & 29/32	1.80	2.70	3.60	**45**

ENGINEERS' WRENCHES—Continued

15° Angle, Double Head



In Stock with openings for U. S. Standard Finished Nuts; Whitworth Standard, Metric Measure or special openings milled to order. See page 10 for special conditions, and various styles of finish.

No	For U. S. Standard Nuts Size Bolts	Openings Milled	Extreme Length, Approx.	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	No.
46	1 1/8 & 1 3/8	1 13/16 & 2 3/16	21	27/32 & 1	$2.05	$3.08	$4.10	46
47	1 1/4 & 1 3/8	2 & 2 3/16	21	29/32 & 1	2.30	3.45	4.60	47
48	1 1/4 & 1 1/2	2 & 2 3/8	23	29/32 & 1 1/16	2.65	3.98	5.30	48
49	1 3/8 & 1 1/2	2 3/16 & 2 3/8	23	1 & 1 1/16	3.00	4.50	6.00	49
50	1 3/8 & 1 5/8	2 3/16 & 2 9/16	25	1 & 1 1/8	3.35	5.03	6.70	50
51	1 1/2 & 1 5/8	2 3/8 & 2 9/16	25	1 1/16 & 1 1/8	3.80	5.70	7.60	51
52	1 1/2 & 1 3/4	2 3/8 & 2 3/4	27	1 1/16 & 1 7/32	4.25	6.38	8.50	52
53	1 5/8 & 1 3/4	2 9/16 & 2 3/4	27	1 1/8 & 1 7/32	4.70	7.05	9.40	53
53A	1 5/8 & 1 7/8	2 9/16 & 2 15/16	29	1 1/8 & 1 7/32	5.30	7.95	10.60	53A
54	1 5/8 & 2	2 9/16 & 3 1/8	31	1 1/8 & 1 3/8	5.90	8.85	11.80	54
55	1 3/4 & 2	2 3/4 & 3 1/8	32	1 7/32 & 1 3/8	6.50	9.75	13.00	55
55A	1 7/8 & 2	2 15/16 & 3 1/8	33	1 7/32 & 1 3/8	7.35	11.03	14.70	55A
56	1 3/4 & 2 1/4	2 3/4 & 3 1/2	34	1 7/32 & 1 17/32	8.20	12.30	16.40	56
56A	1 7/8 & 2 1/4	2 15/16 & 3 1/2	35	1 7/32 & 1 17/32	9.05	13.58	18.10	56A
57	2 & 2 1/4	3 1/8 & 3 1/2	36	1 3/8 & 1 17/32	10.25	15.38	20.50	57
57A	2 & 2 1/2	3 1/8 & 3 7/8	37	1 3/8 & 1 5/8	11.50	17.25	23.00	57A
58	2 1/4 & 2 1/2	3 1/2 & 3 7/8	38	1 17/32 & 1 5/8	12.75	19.13	25.50	58
59	2 1/4 & 2 3/4	3 1/2 & 4 1/4	39	1 17/32 & 1 5/8	14.50	21.75	29.00	59
60	2 1/2 & 2 3/4	3 7/8 & 4 1/4	40	1 5/8 & 1 5/8	16.25	24.38	32.50	60
61	2 1/2 & 3	3 7/8 & 4 5/8	42	1 5/8 & 1 7/8	18.00	27.00	36.00	61
62	2 3/4 & 3	4 1/4 & 4 5/8	44	1 5/8 & 1 7/8	20.50	30.75	41.00	62
63	2 3/4 & 3 1/2	4 1/4 & 5 3/8	46	1 5/8 & 2 1/2	23.00	34.50	46.00	63
64	3 & 3 1/2	4 5/8 & 5 3/8	48	1 7/8 & 2 1/2	25.50	38.25	51.00	64

CHECK NUT
OR
"THIN" WRENCHES
15° Angle, Single Head



For Check, Jam or Lock Nuts, etc.

In Stock with openings for U. S. Standard Finished Nuts; Whitworth Standard-Metric Measure or special openings milled to order. See page 10 for special conditions and various styles of finish.

This class of Wrench is guaranteed amply strong for its intended purposes, but is not designed for severe service.

Number	For U. S Standard Nuts; Size Bolts	Opening Milled	Extreme Length	Thickness Head	PRICE			Number
					Unfinished	Semi-finished	Finished	
601	**1/4**	1/2	4	5/32	$.10	$.15	$.20	**601**
602	**5/16**	19/32	4 1/2	11/64	.11	.17	.22	**602**
603	**3/8**	11/16	5 1/8	3/16	.13	.20	.26	**603**
604	**7/16**	25/32	5 7/8	7/32	.15	.23	.30	**604**
605	**1/2**	7/8	6 5/8	1/4	.18	.27	.36	**605**
606	**9/16**	31/32	7 1/2	9/32	.22	.33	.44	**606**
607	**5/8**	1 1/16	8 1/2	5/16	.28	.42	.56	**607**
608	**3/4**	1 1/4	10	3/8	.36	.54	.72	**608**
609	**7/8**	1 7/16	11 1/2	7/16	.46	.69	.92	**609**
610	**1**	1 5/8	13 1/4	1/2	.60	.90	1.20	**610**

CHECK NUT
OR
"THIN" WRENCHES

15° Angle, Double Head



For Check, Jam or Lock Nuts, etc.

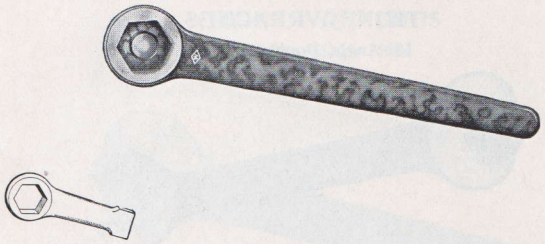
In Stock with openings for U. S. Standard Finished Nuts; Whitworth Standard, Metric Measure or special openings milled to order. See page 10 for special conditions and various styles of finish.

For desirable selections of these Wrenches in Sets see pages 54 to 56. This class of Wrench is guaranteed amply strong for its intended purposes, but is not designed for severe service.

Number	For U. S. Standard Nuts; Size Bolts	Openings Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
623	**3/16 & 1/4**	13/32 & 1/2	4 3/8	9/64 & 5/32	$.14	$.21	$.28	**623**
624	**3/16 & 5/16**	13/32 & 19/32	4 3/8	9/64 & 5/32	.14	.21	.28	**624**
625	**1/4 & 5/16**	1/2 & 19/32	4 3/8	9/64 & 5/32	.14	.21	.28	**625**
626	**1/4 & 3/8**	1/2 & 11/16	5 1/2	5/32 & 3/16	.19	.29	.38	**626**
627	**5/16 & 3/8**	19/32 & 11/16	5 1/2	5/32 & 3/16	.19	.29	.38	**627**
628	**5/16 & 7/16**	19/32 & 25/32	5 1/2	5/32 & 3/16	.19	.29	.38	**628**
629	**3/8 & 7/16**	11/16 & 25/32	6 7/8	3/16 & 7/32	.25	.38	.50	**629**
630	**3/8 & 1/2**	11/16 & 7/8	6 7/8	3/16 & 7/32	.25	.38	.50	**630**
631	**7/16 & 1/2**	25/32 & 7/8	6 7/8	3/16 & 7/32	.25	.38	.50	**631**
632	**7/16 & 9/16**	25/32 & 31/32	8 1/2	7/32 & 9/32	.33	.50	.66	**632**
633	**1/2 & 9/16**	7/8 & 31/32	8 1/2	7/32 & 9/32	.33	.50	.66	**633**
634	**1/2 & 5/8**	7/8 & 1 1/16	8 1/2	7/32 & 9/32	.33	.50	.66	**634**
635	**9/16 & 5/8**	31/32 & 1 1/16	10 3/8	9/32 & 5/16	.44	.66	.88	**635**
636	**9/16 & 3/4**	31/32 & 1 1/4	10 3/8	9/32 & 5/16	.44	.66	.88	**636**
637	**5/8 & 3/4**	1 1/16 & 1 1/4	10 3/8	9/32 & 5/16	.44	.66	.88	**637**
638	**5/8 & 7/8**	1 1/16 & 1 7/16	12 5/8	5/16 & 7/16	.60	.90	1.20	**638**
639	**3/4 & 7/8**	1 1/4 & 1 7/16	12 5/8	5/16 & 7/16	.60	.90	1.20	**639**
640	**3/4 & 1**	1 1/4 & 1 5/8	12 5/8	5/16 & 7/16	.60	.90	1.20	**640**

HEXAGON BOX WRENCHES

15° Angle, Single Head



Designed for purposes where there is necessity for an exceedingly strong and light tool and places where head clearance is limited.

In Stock with broached openings for U. S. Standard Finished Nuts. See page 10 for special conditions and various styles of finish.

*At small extra charge Numbers 818 to 820 inclusive are also furnished with "striking-face" on end of handle as shown by small outline cut; lengths as follows:

Number,	818	819	819A	820
Length,	18 1/2	19 1/4	20	21

Number	For U. S. Standard Nut Size Bolt	Short Diameter Opening Brchd.	Extreme Length	Head: Thickness	Head: Outside Diameter	PRICE: Unfinished	PRICE: Semi-finished	PRICE: Finished	Number
801	**1/4**	1/2	4	1/4	29/32	$.10	$.15	$.20	**801**
802	**5/16**	39/64	4 7/8	9/32	1 3/32	.12	.18	.24	**802**
803	**3/8**	45/64	5 7/8	5/16	1 1/4	.14	.21	.28	**803**
804	**7/16**	51/64	6 7/8	11/32	1 3/8	.17	.25	.34	**804**
805	**1/2**	57/64	7 3/4	13/32	1 1/2	.20	.30	.40	**805**
806	**9/16**	63/64	8 3/4	7/16	1 5/8	.26	.39	.52	**806**
807	**5/8**	1 5/64	9 7/8	1/2	1 3/4	.32	.48	.64	**807**
808	**3/4**	1 17/64	11 1/2	9/16	2 1/16	.42	.63	.84	**808**
809	**7/8**	1 29/64	13 1/4	21/32	2 3/8	.58	.87	1.16	**809**
810	**1**	1 21/32	15	3/4	2 5/8	.75	1.13	1.50	**810**
811	**1 1/8**	1 27/32	17	13/16	2 7/8	1.00	1.50	2.00	**811**
812	**1 1/4**	2 1/32	19	15/16	3 1/4	1.25	1.88	2.50	**812**
813	**1 3/8**	2 7/32	21	1	3 1/2	1.62	2.43	3.24	**813**
814	**1 1/2**	2 13/32	23	1 1/16	3 3/4	2.00	3.00	4.00	**814**
815	**1 5/8**	2 19/32	25	1 1/8	4	2.50	3.75	5.00	**815**
816	**1 3/4**	2 25/32	27	1 1/4	4 1/4	3.00	4.50	6.00	**816**
817	**2**	3 5/32	30 1/2	1 3/8	4 3/4	4.40	6.60	8.80	**817**
818	**2 1/4**	3 35/64	*34	1 1/2	5 1/4	6.00	9.00	12.00	**818**
819	**2 1/2**	3 59/64	*38	1 5/8	5 7/8	7.60	11.40	15.20	**819**
819A	**2 3/4**	4 19/64	*42	1 3/4	6 1/2	10.00	15.00	20.00	**819A**
820	**3**	4 43/64	*46	1 7/8	7	13.00	19.50	26.00	**820**

HEXAGON BOX WRENCHES

15° Angle, Double Head



In Stock with broached openings for U. S. Standard Finished Nuts. See page 10 for special conditions and various styles of finish.

No.	For U. S. Standard Nuts; Size Bolts	Short Diameter Opening Broached	Extreme Leng'h	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	No.
825	**1/4 & 5/16**	1/2 & 39/64	4 7/8	1/4 & 9/32	$.18	$.27	$.36	**825**
826	**1/4 & 3/8**	1/2 & 45/64	5 7/8	1/4 & 5/16	.20	.30	.40	**826**
827	**5/16 & 3/8**	39/64 & 45/64	5 7/8	9/32 & 5/16	.22	.33	.44	**827**
828	**5/16 & 7/16**	39/64 & 51/64	6 7/8	9/32 & 11/32	.24	.36	.48	**828**
829	**3/8 & 7/16**	45/64 & 51/64	6 7/8	5/16 & 11/32	.26	.39	.52	**829**
830	**3/8 & 1/2**	45/64 & 57/64	7 3/4	5/16 & 13/32	.28	.42	.56	**830**
831	**7/16 & 1/2**	51/64 & 57/64	7 3/4	11/32 & 13/32	.30	.45	.60	**831**
832	**7/16 & 9/16**	51/64 & 63/64	8 3/4	11/32 & 7/16	.32	.48	.64	**832**
833	**1/2 & 9/16**	57/64 & 63/64	8 3/4	13/32 & 7/16	.36	.54	.72	**833**
834	**1/2 & 5/8**	57/64 & 1 5/64	9 7/8	13/32 & 1/2	.40	.60	.80	**834**
835	**9/16 & 5/8**	63/64 & 1 5/64	9 7/8	7/16 & 1/2	.44	.66	.88	**835**
836	**9/16 & 3/4**	63/64 & 1 17/64	11 1/2	7/16 & 9/16	.51	.77	1.02	**836**
837	**5/8 & 3/4**	1 5/64 & 1 17/64	11 1/2	1/2 & 9/16	.58	.87	1.16	**837**
838	**5/8 & 7/8**	1 5/64 & 1 29/64	13 1/4	1/2 & 21/32	.65	.98	1.30	**838**
839	**3/4 & 7/8**	1 17/64 & 1 29/64	13 1/4	9/16 & 21/32	.76	1.14	1.52	**839**
840	**3/4 & 1**	1 17/64 & 1 21/32	15	9/16 & 3/4	.88	1.32	1.76	**840**
841	**7/8 & 1**	1 29/64 & 1 21/32	15	21/32 & 3/4	1.00	1.50	2.00	**841**
842	**7/8 & 1 1/8**	1 29/64 & 1 27/32	17	21/32 & 13/16	1.18	1.77	2.36	**842**
843	**1 & 1 1/8**	1 21/32 & 1 27/32	17	3/4 & 13/16	1.36	2.04	2.72	**843**
844	**1 & 1 1/4**	1 21/32 & 2 1/32	19	3/4 & 15/16	1.55	2.33	3.10	**844**
845	**1 1/8 & 1 1/4**	1 27/32 & 2 1/32	19	13/16 & 15/16	1.80	2.70	3.60	**845**

Larger Wrenches can be furnished on demand

LIGHT CAP SCREW WRENCHES

15° Angle, Single Head

For Hexagon Head Cap Screws



In Stock with openings for Standard Hexagon Head Cap Screws; Whitworth Standard, Metric Measure or special openings milled to order. See page 10 for special conditions and various styles of finish.

A heavier line of Cap Screw Wrenches including square base openings will be found on pages 20 to 23.

Number	For Hexagon Head Cap Screws; Diameter Screws	Opening, Milled	Extreme Length	Thickness Head	PRICE			Number
					Unfinished	Semi-finished	Finished	
00	**1/8**	5/16	3	5/32	$.08	$.12	$.16	**00**
700	**3/16**	3/8	3 1/2	3/16	.09	.13	.18	**700**
701	**1/4**	7/16	4	1/4	.10	.15	.20	**701**
701A	**5/16**	1/2	4	1/4	.10	.15	.20	**701A**
702	**3/8**	9/16	4 3/4	9/32	.12	.18	.24	**702**
703	**7/16**	5/8	5 5/8	5/16	.14	.21	.28	**703**
704	**1/2**	3/4	6 1/2	11/32	.17	.25	.34	**704**
705	**9/16**	13/16	7 1/2	13/32	.20	.30	.40	**705**
705A	**5/8**	7/8	7 1/2	13/32	.20	.30	.40	**705A**
706	**3/4**	1	8 3/8	7/16	.26	.39	.52	**706**
707	**7/8**	1 1/8	9 1/4	1/2	.32	.48	.64	**707**
708	**1**	1 1/4	11 1/8	9/16	.42	.63	.84	**708**
708A	**1 1/8**	1 3/8	11 1/8	9/16	.42	.63	.84	**708A**
709	**1 1/4**	1 1/2	13	21/32	.58	.87	1.16	**709**
710	**1 3/8**	1 5/8	14 3/4	3/4	.75	1.13	1.50	**710**

LIGHT CAP SCREW WRENCHES

15° Angle, Double Head
For Hexagon Head Cap Screws



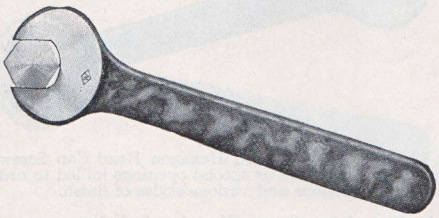
In Stock with openings for Standard Hexagon Head Cap Screws; Whitworth Standard, Metric Measure or special openings milled to order. See page 10 for special conditions and various styles of finish.

A heavier line of Cap Screw Wrenches including square base openings will be found on pages 20 to 23.

Number	For Hexagon Head Cap Screws; Diameter Screws	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
721	**1/8 & 3/16**	5/16 & 3/8	3 1/2	5/32 & 3/16	$.12	$.18	$.24	**721**
722	**1/8 & 1/4**	5/16 & 7/16	4	5/32 & 1/4	.13	.20	.26	**722**
723	**3/16 & 1/4**	3/8 & 7/16	4	3/16 & 1/4	.14	.21	.28	**723**
723A	**3/16 & 5/16**	3/8 & 1/2	4	3/16 & 1/4	.14	.21	.28	**723A**
725	**1/4 & 5/16**	7/16 & 1/2	4 7/8	1/4 & 9/32	.18	.27	.36	**725**
725A	**1/4 & 3/8**	7/16 & 9/16	4 7/8	1/4 & 9/32	.18	.27	.36	**725A**
725B	**5/16 & 3/8**	1/2 & 9/16	4 7/8	1/4 & 9/32	.18	.27	.36	**725B**
726	**5/16 & 7/16**	1/2 & 5/8	5 7/8	1/4 & 5/16	.20	.30	.40	**726**
727	**3/8 & 7/16**	9/16 & 5/8	5 7/8	9/32 & 5/16	.22	.33	.44	**727**
728	**3/8 & 1/2**	9/16 & 3/4	6 7/8	9/32 & 11/32	.24	.36	.48	**728**
729	**7/16 & 1/2**	5/8 & 3/4	6 7/8	5/16 & 11/32	.26	.39	.52	**729**
730	**7/16 & 9/16**	5/8 & 13/16	7 3/4	5/16 & 13/32	.28	.42	.56	**730**
731	**1/2 & 9/16**	3/4 & 13/16	7 3/4	11/32 & 13/32	.30	.45	.60	**731**
731A	**1/2 & 5/8**	3/4 & 7/8	7 3/4	11/32 & 13/32	.30	.45	.60	**731A**
731B	**9/16 & 5/8**	13/16 & 7/8	7 3/4	11/32 & 13/32	.30	.45	.60	**731B**
732	**9/16 & 3/4**	13/16 & 1	8 3/4	11/32 & 7/16	.32	.48	.64	**732**
733	**5/8 & 3/4**	7/8 & 1	8 3/4	13/32 & 7/16	.36	.54	.72	**733**
734	**5/8 & 7/8**	7/8 & 1 1/8	9 3/4	13/32 & 1/2	.40	.60	.80	**734**
735	**3/4 & 7/8**	1 & 1 1/8	9 3/4	7/16 & 1/2	.44	.66	.88	**735**
736	**3/4 & 1**	1 & 1 1/4	11 1/2	7/16 & 9/16	.51	.77	1.02	**736**
737	**7/8 & 1**	1 1/8 & 1 1/4	11 1/2	1/2 & 9/16	.58	.87	1.16	**737**
738	**7/8 & 1 1/8**	1 1/8 & 1 3/8	13 1/2	1/2 & 21/32	.65	.98	1.30	**738**
739	**1 & 1 1/8**	1 1/4 & 1 3/8	13 1/2	9/16 & 21/32	.76	1.14	1.52	**739**
739A	**1 & 1 1/4**	1 1/4 & 1 1/2	13 1/2	9/16 & 21/32	.76	1.14	1.52	**739A**
739B	**1 1/8 & 1 1/4**	1 3/8 & 1 1/2	13 1/2	9/16 & 21/32	.76	1.14	1.52	**739B**

HEAVY CAP SCREW WRENCHES

15° Angle, Single Head
For Hexagon Head Cap Screws



This is a line of extra weight designed to withstand the strain in turning Cap Screws and is considerably stronger than the screws themselves.

In Stock with openings for Standard Hexagon Head Cap Screws; Whitworth Standard, Metric Measure or special openings milled to order. See page 10 for special conditions and various styles of finish.

For Square Head Cap Screw Wrenches see pages 22 and 23.

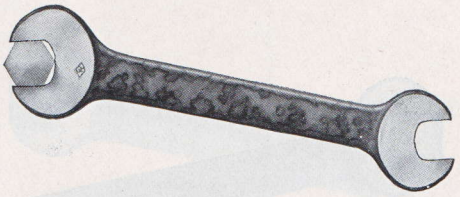
Number	For Hexagon Head Cap Screws; Diameter Screws	Openings, Milled	Extreme Length	Thickness Heads	PRICE			Number
					Unfinished	Semi-finished	Finished	
*1003	3/8	9/16	5	5/16	$.14	$.21	$.28	*1003
1004	7/16	5/8	5 3/4	3/8	.16	.24	.32	1004
1005	1/2	3/4	6 1/2	7/16	.19	.28	.38	1005
1006	9/16	13/16	7 1/4	1/2	.23	.35	.46	1006
1007	5/8	7/8	8	9/16	.28	.42	.56	1007
1008	3/4	1	9 1/2	5/8	.35	.53	.70	1008
1009	7/8	1 1/8	11	3/4	.46	.69	.92	1009
1010	1	1 1/4	12 1/2	7/8	.60	.90	1.20	1010
1011	1 1/8	1 3/8	14	15/16	.76	1.14	1.52	1011
1012	1 1/4	1 1/2	15 1/2	1 1/16	.96	1.44	1.92	1012
1013	1 3/8	1 5/8	17	1 1/8	1.20	1.80	2.40	1013

*For smaller sizes and lighter Cap Screw Wrenches see pages 18 and 19

HEAVY CAP SCREW WRENCHES

15° Angle, Double Head

For Hexagon Head Cap Screws



This is a line of extra weight designed to withstand the strain in turning Cap Screws and is considerably stronger than the screws themselves.

In Stock with openings for Standard Hexagon Head Cap Screws; Whitworth Standard, Metric Measure or special openings milled to order. See page 10 for special conditions and various styles of finish.

For Square Head Cap Screw Wrenches see pages 22 and 23.

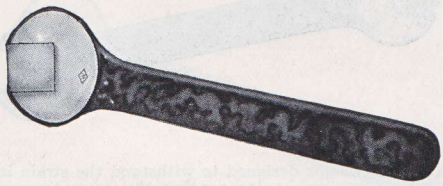
No.	For Hexagon Head Cap Screws; Diameter Screws	Openings Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	No.
*1026	1/4 & 3/8	7/16 & 9/16	5 3/8	7/32 & 5/16	$.20	$.30	$.40	1026
1027	5/16 & 3/8	1/2 & 9/16	5 3/8	1/4 & 5/16	.21	.32	.42	1027
1028	5/16 & 7/16	1/2 & 5/8	6 1/8	1/4 & 3/8	.23	.35	.46	1028
1029	3/8 & 7/16	9/16 & 5/8	6 1/8	5/16 & 3/8	.24	.36	.48	1029
1030	3/8 & 1/2	9/16 & 3/4	7	5/16 & 7/16	.26	.39	.52	1030
1031	7/16 & 1/2	5/8 & 3/4	7	3/8 & 7/16	.27	.40	.54	1031
1032	7/16 & 9/16	5/8 & 13/16	7 3/4	3/8 & 1/2	.30	.45	.60	1032
1033	1/2 & 9/16	3/4 & 13/16	7 3/4	7/16 & 1/2	.32	.48	.64	1033
1034	1/2 & 5/8	*3/4 & 7/8	8 5/8	7/16 & 9/16	.35	.52	.70	1034
1035	9/16 & 5/8	13/16 & 7/8	8 5/8	1/2 & 9/16	.38	.57	.76	1035
1036	9/16 & 3/4	13/16 & 1	10 1/8	1/2 & 5/8	.43	.65	.86	1036
1037	5/8 & 3/4	7/8 & 1	10 1/8	9/16 & 5/8	.47	.70	.94	1037
1038	5/8 & 7/8	7/8 & 1 1/8	11 5/8	9/16 & 3/4	.55	.83	1.10	1038
1039	3/4 & 7/8	1 & 1 1/8	11 5/8	5/8 & 3/4	.61	.92	1.22	1039
1040	3/4 & 1	1 & 1 1/4	13 1/4	5/8 & 7/8	.72	1.08	1.44	1040
1041	7/8 & 1	1 1/8 & 1 1/4	13 1/4	3/4 & 7/8	.79	1.19	1.58	1041
1042	7/8 & 1 1/8	1 1/8 & 1 3/8	14 3/4	3/4 & 15/16	.92	1.38	1.84	1042
1043	1 & 1 1/8	1 1/4 & 1 3/8	14 3/4	7/8 & 15/16	1.02	1.53	2.04	1043
1044	1 & 1 1/4	1 1/4 & 1 1/2	16 1/4	7/8 & 1 1/16	1.18	1.77	2.36	1044
1045	1 1/8 & 1 1/4	1 3/8 & 1 1/2	16 1/4	15/16 & 1 1/16	1.30	1.95	2.60	1045

*For smaller sizes and lighter Cap Screw Wrenches see pages 18 and 19.

HEAVY WRENCHES

15° Angle, Single Head

For Square Head Cap and Set Screws



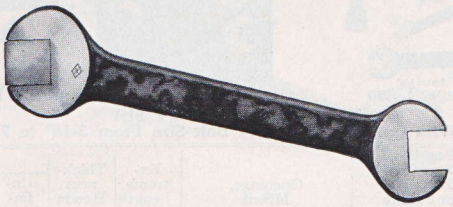
This is a line of extra weight designed to withstand the strain in turning Cap and Set Screws, and is equally adaptable for use on U. S. Standard Square Nuts when milled to order.

In Stock with openings for Standard Square Head Cap Screws. See page 10 for special conditions and various styles of finish. Larger or special sizes to order.

Number	For Square Head Cap Screws; Diameter Screws	For Set Screws	Openings Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
1000B		**5/16**	5/16	3 1/2	3/16	$.09	$.13	$.18	**1000B**
1001A	**1/4**	**3/8**	3/8	4	1/4	.10	.15	.20	**1001A**
1002A	**5/16**	**7/16**	7/16	4 3/4	9/32	.12	.18	.24	**1002A**
1002B	**3/8**	**1/2**	1/2	4 3/4	9/32	.12	.18	.24	**1002B**
1003C	**7/16**	**9/16**	9/16	5	5/16	.14	.21	.28	**1003C**
1004C	**1/2**	**5/8**	5/8	5 3/4	3/8	.16	.24	.32	**1004C**
1005C	**9/16**		11/16	6 1/2	7/16	.19	.28	.38	**1005C**
1006C	**5/8**	**3/4**	3/4	7 1/4	1/2	.23	.35	.46	**1006C**
1007B	**3/4**	**7/8**	7/8	8	9/16	.28	.42	.56	**1007B**
1008C		**1**	1	9 1/2	5/8	.35	.53	.70	**1008C**
1009A	**7/8**	**1 1/8**	1 1/8	11	3/4	.46	.69	.92	**1009A**
1010A	**1**		1 1/4	12 1/2	7/8	.60	.90	1.20	**1010A**
1011A	**1 1/8**		1 3/8	14	15/16	.76	1.14	1.62	**1011A**
1012A	**1 1/4**		1 1/2	15 1/2	1 1/16	.96	1.44	1.92	**1012A**
1013A	**1 3/8**		1 5/8	17	1 1/8	1.20	1.80	2.40	**1013A**

HEAVY WRENCHES

15° Angle, Double Head
For Square Head Cap and Set Screws

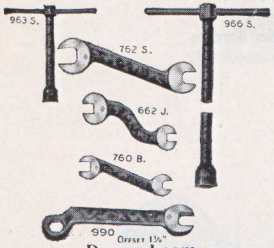


This is a line of extra weight milled especially for Square Head Cap Screws and is equally adaptable for use on U. S. Standard Square Nuts when milled to order.

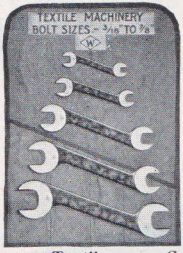
In Stock with openings for Standard Square Head Cap Screws. See page 10 for special conditions and various styles of finish. Larger or special sizes to order.

Number	For Square Head Cap Screws; Diameter Screws	For Set Screws; Sizes	Openings Milled	Extreme Length	Thickness Head	PRICE Unfinished	PRICE Semi-finished	PRICE Finished
1025C	1/4 & 5/16	3/8 & 7/16	3/8 & 7/16	4 7/8	1/4 & 9/32	$.18	$.27	$.36
1025D	1/4 & 3/8	3/8 & 1/2	3/8 & 1/2	4 7/8	1/4 & 9/32	.18	.27	.36
1026C	5/16 & 3/8	7/16 & 1/2	7/16 & 1/2	5 3/8	1/4 & 5/16	.20	.30	.40
1026D	5/16 & 7/16	7/16 & 9/16	7/16 & 9/16	5 3/8	1/4 & 5/16	.20	.30	.40
1027C	3/8 & 7/16	1/2 & 9/16	1/2 & 9/16	5 3/8	1/4 & 5/16	.21	.32	.42
1028C	3/8 & 1/2	1/2 & 5/8	1/2 & 5/8	6 1/8	1/4 & 3/8	.23	.35	.46
1029C	7/16 & 1/2	9/16 & 5/8	9/16 & 5/8	6 1/8	5/16 & 3/8	.24	.36	.48
1031D	1/2 & 5/8	5/8 & 3/4	5/8 & 3/4	7	3/8 & 7/16	.27	.41	.54
1034C	5/8 & 3/4	3/4 & 7/8	3/4 & 7/8	8 5/8	7/16 & 9/16	.35	.53	.70
1038C	5/8 & 7/8	3/4 & 1 1/8	3/4 & 1 1/8	11 5/8	9/16 & 3/4	.55	.83	1.10
1038D	3/4 & 7/8	7/8 & 1 1/8	7/8 & 1 1/8	11 5/8	9/16 & 3/4	.55	.83	1.10
1040C	3/4 & 1	7/8 & 1 1/4	7/8 & 1 1/4	13 1/4	5/8 & 7/8	.72	1.08	1.44
1041C	7/8 & 1	1 1/8 & 1 1/4	1 1/8 & 1 1/4	13 1/4	3/4 & 7/8	.79	1.19	1.58
1042C	7/8 & 1 1/8		1 1/8 & 1 3/8	14 3/4	3/4 & 15/16	.92	1.38	1.84
1043C	1 & 1 1/8		1 1/4 & 1 3/8	14 3/4	7/8 & 15/16	1.02	1.53	2.04

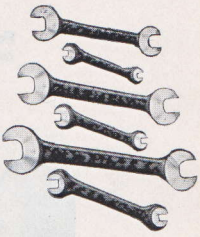
DROP-FORGED TEXTILE MACHINERY WRENCH SETS



Draper Loom



Textile



Crompton & Knowles Loom

TEXTILE MACHINERY SET
With Openings for Every Bolt Size From 3-16″ to 7-8″

Number	For U. S. Standard Hexagon or Square Nuts; Size Bolts	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished
760B	**3/16 & 1/4**	13/32 & 1/2	4 3/4	1/4	$.15	$.23	$.30
761C	**5/16 & 3/8**	19/32 & 11/16	5 3/4	5/16	.20	.30	.40
763A	**7/16 & 1/2**	25/32 & 7/8	8 1/4	7/16	.30	.45	.60
764B	**9/16 & 5/8**	31/32 & 1 1/16	9 1/2	1/2	.38	.57	.76
765C	**3/4 & 7/8**	1 1/4 & 1 7/16	11	9/16	.50	.75	1.00
		List Price of Roll, $.45 extra			$1.53	$2.30	$3.60

DRAPER LOOM SET
With Openings for U. S. Standard Nuts, Cap and Set Screws

Number	For	Size Openings	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished
662J	**3/8 & 1/2** Set Screws	3/8 &1/2	5	5/16	$.17	$.26	$.34
760B	**3/16 & 1/4** Nuts	13/32 & 1/2	4 3/4	1/4	.15	.23	.30
762S	**7/16** Nuts & S.	5/8 & 25/32	7	3/8	.25	.38	.50
963S	**3/8** Set Screw	25/64	7 3/4	11/16*	.44	.60	.75
966S	**1/2** Set Screw	33/64	22 1/2	1*	.65	.90	1.15
990	**7/16&1/2** Blt. **5/8** C.S.	7/8 & 25/32	7 1/4	11/32	.50	.75	1.00
		Price per set			$2.16	$3.12	$4.04

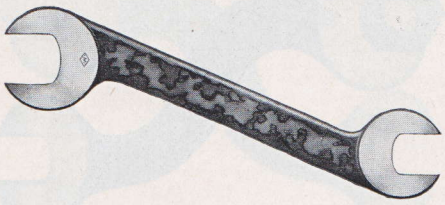
*Diameter.

CROMPTON & KNOWLES LOOM SET
With Openings for Special Nuts and Screws

No.	For	Size Openings	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished
527S	**Special Nuts**	11/32 & 13/32	5	5/16 & 11/32	$.18	$.27	$.36
530S	**& Screws**	15/32 & 17/32	5 7/8	11/32 & 3/8	.22	.33	.44
534S	**on**	19/32 & 21/32	7 1/2	7/16 & 1/2	.33	.50	.66
30S	**Crompton**	25/32 & 27/32	7 3/4	5/16 & 13/32	.28	.42	.56
33S	**& Knowles**	29/32 & 1 1/32	8 3/4	13/32 & 7/16	.36	.54	.72
37S	**Loom**	1 1/4 & 1 13/32	11 1/2	1/2 & 9/16	.58	.87	1.16
		Price per set			$1.95	$2.93	$3.90

TEXTILE MACHINE WRENCHES

15° Angle, Double Head



In Stock with openings for U. S. Standard Nuts, Hexagon and Square. Whitworth Standard, Metric Measure or special openings milled to order. Wrenches can also be furnished with openings milled for Set Screws and Square and Hexagon Head Cap Screws. For special conditions and various styles of finish see page 10.

Number	For U. S. Standard Hexagon or Square Nuts; Size Bolts	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
760A	**1/8 & 1/4**	5/16 & 1/2	4 3/4	1/4	$.15	$.23	$.30	**760A**
760B	**3/16 & 1/4**	13/32 & 1/2	4 3/4	1/4	.15	.23	.30	**760B**
760C	**3/16 & 5/16**	13/32 & 19/32	4 3/4	1/4	.15	.23	.30	**760C**
761A	**1/4 & 5/16**	1/2 & 19/32	5 3/4	5/16	.20	.30	.40	**761A**
761B	**1/4 & 3/8**	1/2 & 11/16	5 3/4	5/16	.20	.30	.40	**761B**
761C	**5/16 & 3/8**	19/32 & 11/16	5 3/4	5/16	.20	.30	.40	**761C**
762A	**5/16 & 7/16**	19/32 & 25/32	7	3/8	.25	.38	.50	**762A**
762B	**3/8 & 7/16**	11/16 & 25/32	7	3/8	.25	.38	.50	**762B**
762C	**3/8 & 1/2**	11/16 & 7/8	7	3/8	.25	.38	.50	**762C**
763A	**7/16 & 1/2**	25/32 & 7/8	8 1/4	7/16	.30	.45	.60	**763A**
763B	**7/16 & 9/16**	25/32 & 31/32	8 1/4	7/16	.30	.45	.60	**763B**
763C	**1/2 & 9/16**	7/8 & 31/32	8 1/4	7/16	.30	.45	.60	**763C**
764A	**1/2 & 5/8**	7/8 & 1 1/16	9 1/2	1/2	.38	.57	.76	**764A**
764B	**9/16 & 5/8**	31/32 & 1 1/16	9 1/2	1/2	.38	.57	.76	**764B**
764C	**9/16 & 3/4**	31/32 & 1 1/4	9 1/2	1/2	.38	.57	.76	**764C**
765A	**5/8 & 3/4**	1 1/16 & 1 1/4	11	9/16	.50	.75	1.00	**765A**
765B	**5/8 & 7/8**	1 1/16 & 1 7/16	11	9/16	.50	.75	1.00	**765B**
765C	**3/4 & 7/8**	1 1/4 & 1 7/16	11	9/16	.50	.75	1.00	**765C**

"S" WRENCHES WITH FLAT HANDLE

22 1-2° Angle, Double Head
For U. S. Standard Nuts

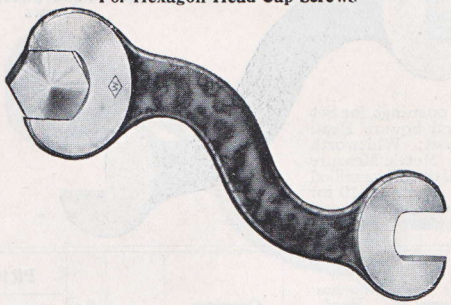


In Stock with openings for U. S. Standard Finished Nuts; Whitworth Standard, Metric Measure and special openings milled to order. See page 10 for special conditions and various styles of finish.

Number	For U. S. Standard Nuts; Size Bolts	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished
661A	**1/8 & 3/16**	5/16 & 13/32	4	9/32	$.13	$.20	$.26
661B	**1/8 & 1/4**	5/16 & 1/2	4	9/32	.13	.20	.26
661C	**3/16 & 1/4**	13/32 & 1/2	4	9/32	.13	.20	.26
662A	**3/16 & 5/16**	13/32 & 19/32	5	5/16	.17	.26	.34
662B	**1/4 & 5/16**	1/2 & 19/32	5	5/16	.17	.26	.34
662C	**1/4 & 3/8**	1/2 & 11/16	5	5/16	.17	.26	.34
663A	**5/16 & 3/8**	19/32 & 11/16	6 1/4	3/8	.22	.33	.44
663B	**5/16 & 7/16**	19/32 & 25/32	6 1/4	3/8	.22	.33	.44
663C	**3/8 & 7/16**	11/16 & 25/32	6 1/4	3/8	.22	.33	.44
664A	**3/8 & 1/2**	11/16 & 7/8	7 1/2	7/16	.28	.42	.56
664B	**7/16 & 1/2**	25/32 & 7/8	7 1/2	7/16	.28	.42	.56
664C	**7/16 & 9/16**	25/32 & 31/32	7 1/2	7/16	.28	.42	.56
665A	**1/2 & 9/16**	7/8 & 31/32	9	1/2	.36	.54	.72
665B	**1/2 & 5/8**	7/8 & 1 1/16	9	1/2	.36	.54	.72
665C	**9/16 & 5/8**	31/32 & 1 1/16	9	1/2	.36	.54	.72
666A	**9/16 & 3/4**	31/32 & 1 1/4	10 1/2	9/16	.48	.72	.96
666B	**5/8 & 3/4**	1 1/16 & 1 1/4	10 1/2	9/16	.48	.72	.96
666C	**5/8 & 7/8**	1 1/16 & 1 7/16	10 1/2	9/16	.48	.72	.96
667A	**3/4 & 7/8**	1 1/4 & 1 7/16	12	5/8	.72	1.08	1.44
667B	**3/4 & 1**	1 1/4 & 1 5/8	12	5/8	.72	1.08	1.44
667C	**7/8 & 1**	1 7/16 & 1 5/8	12	5/8	.72	1.08	1.44
668A	**7/8 & 1 1/8**	1 7/16 & 1 13/16	14	3/4	1.10	1.65	2.20
668B	**1 & 1 1/8**	1 5/8 & 1 13/16	14	3/4	1.10	1.65	2.20
668C	**1 & 1 1/4**	1 5/8 & 2	14	3/4	1.10	1.65	2.20

"S" WRENCHES WITH FLAT HANDLE

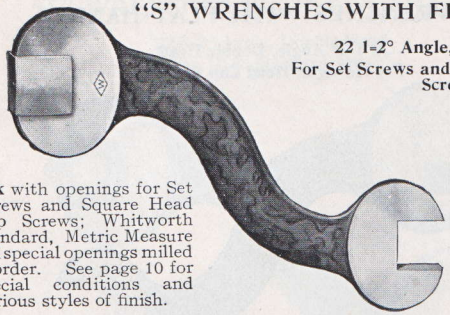
22 1-2° Angle, Double Head
For Hexagon Head Cap Screws



In Stock with openings milled for Hexagon Head Cap Screws; Whitworth Standard, Metric Measure and special openings milled to order. See page 10 for special conditions and various styles of finish.

Number	For Hexagon Head Cap Screws; Diameter Screws	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
661D	**1/8 & 3/16**	5/16 & 3/8	**4**	9/32	$.13	$.20	$.26	**661D**
661E	**1/8 & 1/4**	5/16 & 7/16	**4**	9/32	.13	.20	.26	**661E**
661F	**3/16 & 1/4**	3/8 & 7/16	**4**	9/32	.13	.20	.26	**661F**
661G	**3/16 & 5/16**	3/8 & 1/2	**4**	9/32	.13	.20	.26	**661G**
662D	**1/4 & 5/16**	7/16 & 1/2	**5**	5/16	.17	.26	.34	**662D**
662E	**1/4 & 3/8**	7/16 & 9/16	**5**	5/16	.17	.26	.34	**662E**
662F	**5/16 & 3/8**	1/2 & 9/16	**5**	5/16	.17	.26	.34	**662F**
662G	**5/16 & 7/16**	1/2 & 5/8	**5**	5/16	.17	.26	.34	**662G**
663D	**3/8 & 7/16**	9/16 & 5/8	**6 1/4**	3/8	.22	.33	.44	**663D**
663E	**3/8 & 1/2**	9/16 & 3/4	**6 1/4**	3/8	.22	.33	.44	**663E**
663F	**7/16 & 1/2**	5/8 & 3/4	**6 1/4**	3/8	.22	.33	.44	**663F**
663G	**7/16 & 9/16**	5/8 & 13/16	**6 1/4**	3/8	.22	.33	.44	**663G**
664D	**1/2 & 9/16**	3/4 & 13/16	**7 1/2**	7/16	.28	.42	.56	**664D**
664E	**1/2 & 5/8**	3/4 & 7/8	**7 1/2**	7/16	.28	.42	.56	**664E**
664F	**9/16 & 5/8**	13/16 & 7/8	**7 1/2**	7/16	.28	.42	.56	**664F**
665D	**9/16 & 3/4**	13/16 & **1**	**9**	**1/2**	.36	.54	.72	**665D**
665E	**5/8 & 3/4**	7/8 & **1**	**9**	**1/2**	.36	.54	.72	**665E**
665F	**5/8 & 7/8**	7/8 & 1 1/8	**9**	**1/2**	.36	.54	.72	**665F**
665G	**3/4 & 7/8**	1 & 1 1/8	**9**	**1/2**	.36	.54	.72	**665G**
666D	**3/4 & 1**	1 & 1 1/4	**10 1/2**	9/16	.48	.72	.96	**666D**
666E	**7/8 & 1**	1 1/8 & 1 1/4	**10 1/2**	9/16	.48	.72	.96	**666E**
666F	**7/8 & 1 1/8**	1 1/8 & 1 3/8	**10 1/2**	9/16	.48	.72	.96	**666F**
667D	**1 & 1 1/8**	1 1/4 & 1 3/8	**12**	**5/8**	.72	1.08	1.44	**667D**
667E	**1 & 1 1/4**	1 1/4 & 1 1/2	**12**	**5/8**	.72	1.08	1.44	**667E**
667F	**1 1/8 & 1 1/4**	1 3/8 & 1 1/2	**12**	**5/8**	.72	1.08	1.44	**667F**

"S" WRENCHES WITH FLAT HANDLE



22 1-2° Angle, Double Head
For Set Screws and Square Head Cap Screws

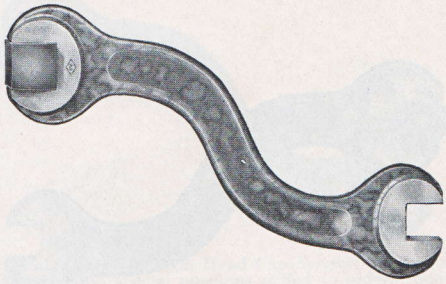
In Stock with openings for Set Screws and Square Head Cap Screws; Whitworth Standard, Metric Measure and special openings milled to order. See page 10 for special conditions and various styles of finish.

Number	For Set Screws; Sizes	For Square Head Cap Screws; Diameter Screws	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
661H	1/4 & 5/16		1/4 & 5/16	4	9/32	$.13	$.20	$.26	**661H**
661J	1/4 & 3/8		1/4 & 3/8	4	9/32	.13	.20	.26	**661J**
661K	5/16 & 3/8		5/16 & 3/8	4	9/32	.13	.20	.26	**661K**
661L	5/16 & 7/16		5/16 & 7/16	4	9/32	.13	.20	.26	**661L**
662H	3/8 & 7/16	1/4 & 5/16	3/8 & 7/16	5	5/16	.17	.26	.34	**662H**
662J	3/8 & 1/2	1/4 & 3/8	3/8 & 1/2	5	5/16	.17	.26	.34	**662J**
662K	7/16 & 1/2	5/16 & 3/8	7/16 & 1/2	5	5/16	.17	.26	.34	**662K**
662L	7/16 & 9/16	5/16 & 7/16	7/16 & 9/16	5	5/16	.17	.26	.34	**662L**
663H	1/2 & 9/16	3/8 & 7/16	1/2 & 9/16	6 1/4	3/8	.22	.33	.44	**663H**
663J	1/2 & 5/8	3/8 & 1/2	1/2 & 5/8	6 1/4	3/8	.22	.33	.44	**663J**
663K	9/16 & 5/8	7/16 & 1/2	9/16 & 5/8	6 1/4	3/8	.22	.33	.44	**663K**
663M		7/16 & 9/16	9/16 & 11/16	6 1/4	3/8	.22	.33	.44	**663M**
664H	9/16 & 3/4		9/16 & 3/4	7 1/2	7/16	.28	.42	.56	**664H**
664M		1/2 & 9/16	5/8 & 11/16	7 1/2	7/16	.28	.42	.56	**664M**
664J	5/8 & 3/4	1/2 & 5/8	5/8 & 3/4	7 1/2	7/16	.28	.42	.56	**664J**
664K	5/8 & 7/8		5/8 & 7/8	7 1/2	7/16	.28	.42	.56	**664K**
664P		9/16 & 5/8	11/16 & 3/4	7 1/2	7/16	.28	.42	.56	**664P**
664R		9/16 & 3/4	11/16 & 7/8	7 1/2	7/16	.28	.42	.56	**664R**
665H	3/4 & 7/8	5/8 & 3/4	3/4 & 7/8	9	1/2	.36	.54	.72	**665H**
665J	3/4 & 1		3/4 & 1	9	1/2	.36	.54	.72	**665J**
665K	7/8 & 1		7/8 & 1	9	1/2	.36	.54	.72	**665K**
666M		5/8 & 7/8	3/4 & 1 1/8	10 1/2	9/16	.48	.72	.96	**666M**
666H	7/8 & 1 1/8	3/4 & 7/8	7/8 & 1 1/8	10 1/2	9/16	.48	.72	.96	**666H**
666R		3/4 & 1	7/8 & 1 1/4	10 1/2	9/16	.48	.72	.96	**666R**
666J	1 & 1 1/8		1 & 1 1/8	10 1/2	9/16	.48	.72	.96	**666J**
666K	1 & 1 1/4		1 & 1 1/4	10 1/2	9/16	.48	.72	.96	**666K**
667H	1 1/8 & 1 1/4	7/8 & 1	1 1/8 & 1 1/4	12	5/8	.72	1.08	1.44	**667H**
667M		7/8 & 1 1/8	1 1/8 & 1 3/8	12	5/8	.72	1.08	1.44	**667M**
667R		1 & 1 1/8	1 1/4 & 1 3/8	12	5/8	.72	1.08	1.44	**667R**
668M		1 & 1 1/4	1 1/4 & 1 1/2	14	3/4	1.10	1.65	2.20	**668M**
668R		1 1/8 & 1 1/4	1 3/8 & 1 1/2	14	3/4	1.10	1.65	2.20	**668R**

"S" WRENCHES WITH CONCAVE HANDLE

22 1-2° Angle, Double Head

For Set Screws and Square Head Cap Screws



In Stock with openings for Standard Square Head Set and Cap Screws. **For** special conditions and various style of finish see page 10.

Number	Old Number	For Set Screws Sizes	For Sq. Head Cap Screws Diam. Screws	Openings Milled	Extreme Leng'h	PRICE		
						Unfinished	Semi-finished	Finished
860H	235A	**1/4 & 5/16**		1/4 & 5/16	3 5/8	$.13	$.20	$.26
860J	235B	**1/4 & 3/8**		1/4 & 3/8	3 5/8	.13	.20	.26
860K	235D	**5/16 & 3/8**		5/16 & 3/8	3 5/8	.13	.20	.26
861H	240A	**5/16 & 7/16**		5/16 & 7/16	4 7/8	.18	.27	.36
861J	240C	**3/8 & 7/16**	**1/4 & 5/16**	3/8 & 7/16	4 7/8	.18	.27	.36
862H	246A	**3/8 & 1/2**	**1/4 & 3/8**	3/8 & 1/2	5 3/4	.21	.32	.42
862J	246C	**7/16 & 1/2**	**5/16 & 3/8**	7/16 & 1/2	5 3/4	.21	.32	.42
862K	246D	**7/16 & 9/16**	**5/16 & 7/16**	7/16 & 9/16	5 3/4	.21	.32	.42
863H	251A	**1/2 & 9/16**	**3/8 & 7/16**	1/2 & 9/16	6 1/2	.25	.38	.50
863J	251B	**1/2 & 5/8**	**3/8 & 1/2**	1/2 & 5/8	6 1/2	.25	.38	.50
864H	255D	**9/16 & 5/8**	**7/16 & 1/2**	9/16 & 5/8	7 1/4	.30	.45	.60
864M	255F		**7/16 & 9/16**	9/16 & 11/16	7 1/4	.30	.45	.60
864J	255G	**9/16 & 3/4**	**7/16 & 5/8**	9/16 & 3/4	7 1/4	.30	.45	.60
864R	255I		**1/2 & 9/16**	5/8 & 11/16	7 1/4	.30	.45	.60
865H	263A	**5/8 & 3/4**		5/8 & 3/4	8	.38	.57	.76
865J	263D	**5/8 & 7/8**		5/8 & 7/8	8	.38	.57	.76
865M	263E		**9/16 & 5/8**	11/16 & 3/4	8	.38	.57	.76
865R	263F		**9/16 & 3/4**	11/16 & 7/8	8	.38	.57	.76
865K	263H	**3/4 & 7/8**	**5/8 & 3/4**	3/4 & 7/8	8	.38	.57	.76
866H	274A	**3/4 & 1**		3/4 & 1	10	.50	.75	1.00
866J	274F	**7/8 & 1**		7/8 & 1	10	.50	.75	1.00
867H	281A	**7/8 & 1 1/8**	**3/4 & 7/8**	7/8 & 1 1/8	11 1/2	.75	1.13	1.50
867J	281B	**1 & 1 1/8**		1 & 1 1/8	11 1/2	.75	1.13	1.50
867K	281C	**1 & 1 1/4**		1 & 1 1/4	11 1/2	.75	1.13	1.50
867L	281D	**1 1/8 & 1 1/4**	**7/8 & 1**	1 1/8 & 1 1/4	11 1/2	.75	1.13	1.50
868M	288A		**7/8 & 1 1/8**	1 1/8 & 1 3/8	14 1/2	1.15	1.73	2.30
868K	288B		**7/8 & 1 1/4**	1 1/8 & 1 1/2	14 1/2	1.15	1.73	2.30
868R	288C		**1 & 1 1/8**	1 1/4 & 1 3/8	14 1/2	1.15	1.73	2.30
868U	288D		**1 & 1 1/4**	1 1/4 & 1 1/2	14 1/2	1.15	1.73	2.30
868Y	288E		**1 1/8 & 1 1/4**	1 3/8 & 1 1/2	14 1/2	1.15	1.73	2.30

"S" WRENCHES WITH CONCAVE HANDLE

22 1-2° Angle, Double Head
For U. S. Standard Nuts

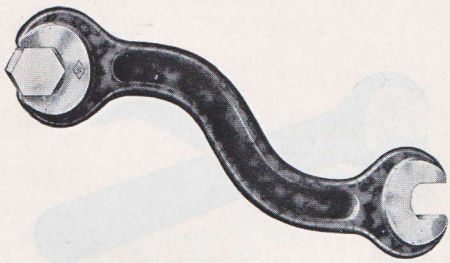


In Stock with openings for U. S. Standard Finished Nuts; Whitworth Standard, Metric Measure and special openings milled to order. See page 10 for special conditions and various styles of finish.

Number	Old Number	For U. S. Standard Nuts; Size Bolts	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished
860A	235E	**1/8 & 3/16**	5/16 & 13/32	3 5/8	1/4 & 9/32	$.13	$.20	$.26
861A	240B	**1/8 & 1/4**	5/16 & 1/2	4 7/8	9/32 & 5/16	.18	.27	.36
861B	240E	**3/16 & 1/4**	13/32 & 1/2	4 7/8	9/32 & 5/16	.18	.27	.36
861C	240F	**3/16 & 5/16**	13/32 & 19/32	4 7/8	9/32 & 5/16	.18	.27	.36
861X	240G	**1/4 & 5/16**	1/2 & 19/32	4 7/8	9/32 & 5/16	.18	.27	.36
862A	246I	**1/4 & 3/8**	1/2 & 11/16	5 3/4	5/16 & 11/32	.21	.32	.42
863A	251E	**5/16 & 3/8**	19/32 & 11/16	6 1/2	3/8 & 13/32	.25	.38	.50
863B	251F	**5/16 & 7/16**	19/32 & 25/32	6 1/2	3/8 & 13/32	.25	.38	.50
864A	255J	**3/8 & 7/16**	11/16 & 25/32	7 1/4	13/32 & 7/16	.30	.45	.60
864B	255K	**3/8 & 1/2**	11/16 & 7/8	7 1/4	13/32 & 7/16	.30	.45	.60
865A	263J	**7/16 & 1/2**	25/32 & 7/8	8	1/2 & 17/32	.38	.57	.76
865B	263K	**7/16 & 9/16**	25/32 & 31/32	8	1/2 & 17/32	.38	.57	.76
865C	263L	**1/2 & 9/16**	7/8 & 31/32	8	1/2 & 17/32	.38	.57	.76
865X	263M	**1/2 & 5/8**	7/8 & 1 1/16	8	1/2 & 17/32	.38	.57	.76
866A	274G	**9/16 & 5/8**	31/32 & 1 1/16	10	17/32 & 9/16	.50	.75	1.00
866B	274H	**9/16 & 3/4**	31/32 & 1 1/4	10	17/32 & 9/16	.50	.75	1.00
866C	274I	**5/8 & 3/4**	1 1/16 & 1 1/4	10	17/32 & 9/16	.50	.75	1.00
867A	281J	**5/8 & 7/8**	1 1/16 & 1 7/16	11 1/2	5/8 & 11/16	.75	1.13	1.50
867B	281K	**3/4 & 7/8**	1 1/4 & 1 7/16	11 1/2	5/8 & 11/16	.75	1.13	1.50
868A	288K	**3/4 & 1**	1 1/4 & 1 5/8	14 1/2	3/4 & 7/8	1.15	1.73	2.30
868B	288L	**7/8 & 1**	1 7/16 & 1 5/8	14 1/2	3/4 & 7/8	1.15	1.73	2.30
868C	288M	**7/8 & 1 1/8**	1 7/16 & 1 13/16	14 1/2	3/4 & 7/8	1.15	1.73	2.30

"S" WRENCHES WITH CONCAVE HANDLE

22 1-2° Angle, Double Head
For Hexagon Head Cap Screws



In Stock with openings for Hexagon Head Cap Screws; Whitworth Standard Metric Measure and special openings milled to order. See page 10 for special conditions and various styles of finish.

Number	Old Number	For Hexagon Head Cap Screws; Diameter Screws	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
861D	240D	**3/16 & 1/4**	3/8 & 7/16	4 7/8	9/32 & 5/16	$.18	$.27	$.36	**861D**
862D	246E	**3/16 & 5/16**	3/8 & 1/2	5 3/4	5/16 & 11/32	.21	.32	.42	**862D**
862E	246F	**3/16 & 3/8**	3/8 & 9/16	5 3/4	5/16 & 11/32	.21	.32	.42	**862E**
862F	246G	**1/4 & 5/16**	7/16 & 1/2	5 3/4	5/16 & 11/32	.21	.32	.42	**862F**
862G	246H	**1/4 & 3/8**	7/16 & 9/16	5 3/4	5/16 & 11/32	.21	.32	.42	**862G**
863D	251C	**5/16 & 3/8**	1/2 & 9/16	6 1/2	3/8 & 13/32	.25	.38	.50	**863D**
863E	251D	**5/16 & 7/16**	1/2 & 5/8	6 1/2	3/8 & 13/32	.25	.38	.50	**863E**
864D	255C	**5/16 & 1/2**	1/2 & 3/4	7 1/4	13/32 & 7/16	.30	.45	.60	**864D**
864E	255E	**3/8 & 7/16**	9/16 & 5/8	7 1/4	13/32 & 7/16	.30	.45	.60	**864E**
864F	255H	**3/8 & 1/2**	9/16 & 3/4	7 1/4	13/32 & 7/16	.30	.45	.60	**864F**
865D	263B	**7/16 & 1/2**	5/8 & 3/4	8	1/2 & 17/32	.38	.57	.76	**865D**
865E	263C	**7/16 & 9/16**	5/8 & 13/16	8	1/2 & 17/32	.38	.57	.76	**865E**
865F	263G	**1/2 & 9/16**	3/4 & 13/16	8	1/2 & 17/32	.38	.57	.76	**865F**
865G	263I	**1/2 & 5/8**	3/4 & 7/8	8	1/2 & 17/32	.38	.57	.76	**865G**
866D	274B	**1/2 & 3/4**	3/4 & 1	10	17/32 & 9/16	.50	.75	1.00	**866D**
866E	274C	**9/16 & 5/8**	13/16 & 7/8	10	17/32 & 9/16	.50	.75	1.00	**866E**
866F	274D	**9/16 & 3/4**	13/16 & 1	10	17/32 & 9/16	.50	.75	1.00	**866F**
866G	274E	**5/8 & 3/4**	7/8 & 1	10	17/32 & 9/16	.50	.75	1.00	**866G**
867D	281F	**5/8 & 7/8**	7/8 & 1 1/8	11 1/2	5/8 & 11/16	.75	1.13	1.50	**867D**
867E	281G	**3/4 & 7/8**	1 & 1 1/8	11 1/2	5/8 & 11/16	.75	1.13	1.50	**867E**
867F	281H	**3/4 & 1**	1 & 1 1/4	11 1/2	5/8 & 11/16	.75	1.13	1.50	**867F**
867G	281I	**7/8 & 1**	1 1/8 & 1 1/4	11 1/2	5/8 & 11/16	.75	1.13	1.50	**867G**
868D	288F	**7/8 & 1 1/8**	1 1/8 & 1 3/8	14 1/2	3/4 & 7/8	1.15	1.73	2.30	**868D**
868E	288G	**7/8 & 1 1/4**	1 1/8 & 1 1/2	14 1/2	3/4 & 7/8	1.15	1.73	2.30	**868E**
868F	288H	**1 & 1 1/8**	1 1/4 & 1 3/8	14 1/2	3/4 & 7/8	1.15	1.73	2.30	**868F**
868G	288I	**1 & 1 1/4**	1 1/4 & 1 1/2	14 1/2	3/4 & 7/8	1.15	1.73	2.30	**868G**
868X	288J	**1 1/8 & 1 1/4**	1 3/8 & 1 1/2	14 1/2	3/4 & 7/8	1.15	1.73	2.30	**868X**

SET SCREW WRENCHES

22 1-2° Angle, Single Head



In Stock with openings for Standard Set Screws. See page 10 for special conditions and various styles of finish.

Number	Old Number	For Set Screw; Size	Extreme Length	Thickness Head	PRICE			Number
					Unfinished	Semi-finished	Finished	
500	92	**3/16**	3	3/16	$.08	$.12	$.16	**500**
501	93	**1/4**	3 3/4	1/4	.10	.15	.20	**501**
502	94	**5/16**	4 1/2	5/16	.12	.18	.24	**502**
503	95	**3/8**	5 1/4	11/32	.15	.23	.30	**503**
504	96	**7/16**	6	3/8	.20	.30	.40	**504**
505	97	**1/2**	6 3/4	7/16	.25	.38	.50	**505**
506	98	**9/16**	7 5/8	1/2	.27	.41	.54	**506**
507	99	**5/8**	8 1/2	9/16	.30	.45	.60	**507**
508	100	**3/4**	9 1/2	5/8	.35	.53	.70	**508**
509	101	**7/8**	10 1/2	11/16	.42	.63	.84	**509**
510	102	**1**	11 1/2	3/4	.50	.75	1.00	**510**
511	103	**1 1/8**	12 1/2	13/16	.60	.90	1.20	**511**

SET SCREW WRENCHES

22 1-2° Angle, Double Head



In Stock with openings for Standard Set Screws. See page 10 for special conditions and various styles of finish.

The openings may be milled larger than stated in table.

Number	Old Number	For Set Screws; Size	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
523	65	**3/16 & 1/4**	3 3/8	7/32	$.13	$.20	$.26	**523**
524	66	**3/16 & 5/16**	3 3/8	7/32	.13	.20	.26	**524**
525	67	**1/4 & 5/16**	4	9/32	.15	.23	.30	**525**
526	68	**1/4 & 3/8**	4	9/32	.15	.23	.30	**526**
527	69	**5/16 & 3/8**	5	11/32	.18	.27	.36	**527**
528	70	**5/16 & 7/16**	5	11/32	.18	.27	.36	**528**
529	71	**3/8 & 7/16**	5 7/8	3/8	.22	.33	.44	**529**
530	72	**3/8 & 1/2**	5 7/8	3/8	.22	.33	.44	**530**
531	73	**7/16 & 1/2**	6 5/8	7/16	.27	.41	.54	**531**
532	74	**7/16 & 9/16**	6 5/8	7/16	.27	.41	.54	**532**
533	75	**1/2 & 9/16**	7 1/2	1/2	.33	.50	.66	**533**
534	76	**1/2 & 5/8**	7 1/2	1/2	.33	.50	.66	**534**
535	77	**9/16 & 5/8**	8 3/8	9/16	.40	.60	.80	**535**
536	78	**9/16 & 3/4**	8 3/8	9/16	.40	.60	.80	**536**
537	79	**5/8 & 3/4**	10	5/8	.48	.72	.96	**537**
538	80	**5/8 & 7/8**	10	5/8	.48	.72	.96	**538**
539	81	**3/4 & 7/8**	11 3/8	11/16	.58	.87	1.16	**539**
540	82	**3/4 & 1**	11 3/8	11/16	.58	.87	1.16	**540**
541	83	**7/8 & 1**	12 5/8	3/4	.68	1.02	1.36	**541**
542	84	**7/8 & 1 1/8**	12 5/8	3/4	.68	1.02	1.36	**542**

J. H. WILLIAMS & CO.

SQUARE BOX WRENCHES

22 1-2° Angle, Single Head



In Stock with openings for Standard Set Screws. See page 10 for special conditions and various styles of finish.

Number	Old Number	For Set Screw; Size	Extreme Length	Head		PRICE			Number
				Thickness	Outside Diam.	Unfinished	Semi-finished	Finished	
580	107	**3/16**	3	1/4	17/32	$.09	$.12	$.18	**580**
581	108	**1/4**	3 3/8	9/32	5/8	.10	.15	.20	**581**
582	109	**5/16**	3 3/4	5/16	23/32	.11	.17	.22	**582**
583	110	**3/8**	4 1/4	3/8	27/32	.13	.20	.26	**583**
584	111	**7/16**	4 7/8	7/16	31/32	.16	.24	.32	**584**
585	112	**1/2**	5 1/2	15/32	1 3/32	.19	.28	.38	**585**
586	113	**9/16**	6 1/4	1/2	1 7/32	.22	.33	.44	**586**
587	114	**5/8**	7	9/16	1 11/32	.26	.39	.52	**587**
588	115	**3/4**	8	5/8	1 9/16	.30	.45	.60	**588**
589	116	**7/8**	9	11/16	1 3/4	.36	.54	.72	**589**
590	117	**1**	10	3/4	2	.44	.66	.88	**590**

MACHINE WRENCHES

Extra Heavy for Planers Milling Machines, Lathes, Drill Presses, Etc.

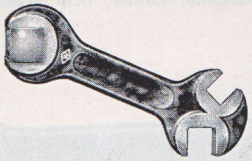


In Stock with openings for U. S. Standard Finished Nuts and Set Screws. See page 10 for special conditions and various styles of finish.

No.	Old No.	Large Head for U. S. Standard Nut		Small Head for Set Screw; Size	Extreme L'gth	Thickness Heads	PRICE			No.
		Size Bolt	Opening, Milled				Unfinished	Semi-finished	Finished	
595	395A	**3/8**	11/16	**3/8**	6 1/2	1/2 & 9/16	$.27	$.41	$.54	**595**
595B	395B	**3/8**	11/16	**7/16**	6 1/2	1/2 & 9/16	.27	.41	.54	**595B**
595C	395C	**3/8**	11/16	**1/2**	6 1/2	1/2 & 9/16	.27	.41	.54	**595C**
595D	395D	**7/16**	25/32	**3/8**	6 1/2	1/2 & 9/16	.27	.41	.54	**595D**
595E	395E	**7/16**	25/32	**7/16**	6 1/2	1/2 & 9/16	.27	.41	.54	**595E**
595F	395F	**7/16**	25/32	**1/2**	6 1/2	1/2 & 9/16	.27	.41	.54	**595F**
596	396A	**1/2**	7/8	**7/16**	7 1/2	9/16 & 5/8	.33	.50	.66	**596**
596B	396B	**1/2**	7/8	**1/2**	7 1/2	9/16 & 5/8	.33	.50	.66	**596B**
596C	396C	**1/2**	7/8	**9/16**	7 1/2	9/16 & 5/8	.33	.50	.66	**596C**
596D	396D	**1/2**	7/8	**5/8**	7 1/2	9/16 & 5/8	.33	.50	.66	**596D**
596E	396E	**9/16**	31/32	**7/16**	7 1/2	9/16 & 5/8	.33	.50	.66	**596E**
596F	396F	**9/16**	31/32	**1/2**	7 1/2	9/16 & 5/8	.33	.50	.66	**596F**
596G	396G	**9/16**	31/32	**9/16**	7 1/2	9/16 & 5/8	.33	.50	.66	**596G**
596H	396H	**9/16**	31/32	**5/8**	7 1/2	9/16 & 5/8	.33	.50	.66	**596H**
597	397A	**5/8**	1 1/16	**9/16**	8 1/2	5/8 & 11/16	.41	.62	.82	**597**
597B	397B	**5/8**	1 1/16	**5/8**	8 1/2	5/8 & 11/16	.41	.62	.82	**597B**
597C	397C	**5/8**	1 1/16	**3/4**	8 1/2	5/8 & 11/16	.41	.62	.82	**597C**
598	398A	**3/4**	1 1/4	**3/4**	10	11/16 & 13/16	.52	.78	1.04	**598**
598B	398B	**3/4**	1 1/4	**7/8**	10	11/16 & 13/16	.52	.78	1.04	**598B**
598C	398C	**3/4**	1 1/4	**1**	10	11/16 & 13/16	.52	.78	1.04	**598C**
598D	398D	**7/8**	1 7/16	**3/4**	10	11/16 & 13/16	.52	.78	1.04	**598D**
598E	398E	**7/8**	1 7/16	**7/8**	10	11/16 & 13/16	.52	.78	1.04	**598E**
598F	398F	**7/8**	1 7/16	**1**	10	11/16 & 13/16	.52	.78	1.04	**598F**

TRIPLE HEAD WRENCHES

For U. S. Standard Nuts and Set Screws

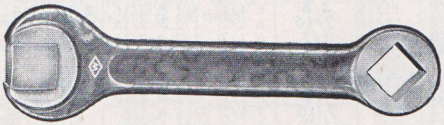


See page 10 for special conditions and various styles of finish.

No.	Old No	For U. S. Standard Nut, Size Bolts	For Set Screws; Sizes	Extreme L'gth	Thickness H'ds	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	No.
894A	464A	**5/16, 3/8, 1/2**		5 5/8	3/8	$.28	$.42	$.56	**894A**
894B	464B	**5/16, 7/16, 1/2**		5 5/8	3/8	.28	.42	.56	**894B**
894C	464C	**3/8, 7/16, 1/2**		5 5/8	3/8	.28	.42	.56	**894C**
894D	464D		**1/2, 5/8, 3/4**	5 5/8	3/8	.28	.42	.56	**894D**
894E	464E		**9/16, 5/8, 3/4**	5 5/8	3/8	.28	.42	.56	**894E**

DOUBLE HEAD TOOL POST WRENCHES

For Set Screws



These wrenches are equally adaptable for use on Cap Screws. See on page 10 explanation of the conditions in which they are furnished.

No.	Old No.	Open End for Set Screw; Size	Closed End for Set Screw; Size	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	No.
554	152	**7/16**	**7/16**	5 1/2	1/2 & 1/2	$.21	$.32	$.42	**554**
555	154	**1/2**	**1/2**	6	9/16 & 9/16	.23	.35	.46	**555**
555B	156	**9/16**	**1/2**	6	9/16 & 9/16	.23	.35	.46	**555B**
555C	157	**9/16**	**9/16**	6	9/16 & 9/16	.23	.35	.46	**555C**
556	158	**5/8**	**5/8**	6 3/4	5/8 & 5/8	.30	.45	.60	**556**
556B	160	**11/16**	**5/8**	6 3/4	5/8 & 5/8	.30	.45	.60	**556B**
556C	161	**11/16**	**11/16**	6 3/4	5/8 & 5/8	.30	.45	.60	**556C**
557	162	**3/4**	**3/4**	7 1/2	11/16 & 11/16	.35	.52	.70	**557**

DOUBLE HEAD TOOL POST WRENCHES

For U. S. Standard Nuts and Set Screws



In Stock with openings for U. S. Standard Finished Nuts and Set Screws; Whitworth Standard, Metric Measure or special openings milled or broached to order. These wrenches are equally adaptable for use on Cap Screws. See page 10 for special conditions and various styles of finish.

No	Old No	Open End for U. S Standard Nut		Closed End for Set Screw; Size	Extreme L'gth	Thickness Heads	PRICE			No.
		Size Bolt	Opening, Milled				Unfinished	Semi-finished	Finished	
562	124	**3/8**	11/16	**9/16**	6 1/2	1/2 & 5/8	$.25	$.38	$.50	**562**
563	129	**1/2**	7/8	**7/16**	7	9/16 & 5/8	.30	.45	.60	**563**
563B	130	**1/2**	7/8	**1/2**	7	9/16 & 5/8	.30	.45	.60	**563B**
563C	131	**1/2**	7/8	**9/16**	7	9/16 & 5/8	.30	.45	.60	**563C**
563D	132	**1/2**	7/8	**5/8**	7	9/16 & 5/8	.30	.45	.60	**563D**
564	139	**5/8**	1 1/16	**5/8**	7 1/2	5/8 & 5/8	.35	.52	.70	**564**
565	140	**5/8**	1 1/16	**3/4**	8	11/16 & 11/16	.40	.60	.80	**565**
566	143	**3/4**	1 1/4	**3/4**	9	3/4 & 3/4	.50	.75	1.00	**566**
566B	144	**3/4**	1 1/4	**7/8**	9	3/4 & 3/4	.50	.75	1.00	**566B**
567	145	**3/4**	1 1/4	**1**	10	**7/8 & 7/8**	.60	.90	1.20	**567**
567B	146	**7/8**	1 7/16	**7/8**	10	7/8 & 7/8	.60	.90	1.20	**567B**
567C	147	**7/8**	1 7/16	**1**	10	7/8 & 7/8	.60	.90	1.20	**567C**
568	148	**1**	1 5/8	**7/8**	11	15/16 & 15/16	.75	1.13	1.50	**568**
568B	149	**1**	1 5/8	**1**	11	15/16 & 15/16	.75	1.13	1.50	**568B**
568C	150	**1 1/8**	1 13/16	**1**	11	15/16 & 15/16	.75	1.13	1.50	**568C**
568D	151	**1 1/4**	2	**1**	11	15/16 & 15/16	.75	1.13	1.50	**568D**

TRACK WRENCHES

Straight Opening



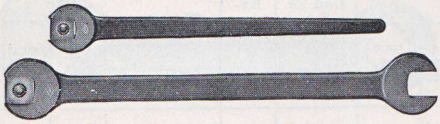
Unfinished are broached or milled.

Semi-Finished are broached or milled and case-hardened all over; heads not ground. Length of handle can be varied, if desired. See page 10 for special conditions.

Number	For U. S Standard Nuts, Size Bolt	Openings	Extreme Length	PRICE Unfinished	PRICE Semi-finished	Number
194	3/4	1 5/16	24	$.60	$.90	194
195		1 7/16	24	.60	.90	195
196A	7/8	1 1/2	27	.75	1.13	196A
196		1 9/16	27	.75	1.13	196
197	1	1 11/16	27	.75	1.13	197
198		1 13/16	30	1.20	1.80	198
199A	1 1/8	1 7/8	30	1.20	1.80	199A
199		1 15/16	30	1.20	1.80	199

STRAIGHT FLAT HANDLE WRENCHES

Unfinished



Unfinished are broached only. Case-hardened wrenches to order.

No.	Kind	Outside Diameter of Nuts	Openings	Extreme Length	Thickness Heads	PRICE Unfinished	No.
173	Single Head	1 3/16	1 1/4	23	3/4	$.80	173
174	" "	1 1/4	1 5/16	23	3/4	.80	174
175	" "	1 3/8	1 7/16	23	3/4	.80	175
176	" "	1 1/2	1 9/16	23	3/4	1.00	176
177	" "	1 5/8	1 11/16	23	3/4	1.00	177
182	Double Head	1 3/16 & 1 1/4	1 1/4 & 1 5/16	24	3/4	1.35	182
184	" "	1 1/4 & 1 3/8	1 5/16 & 1 7/16	24	3/4	1.35	184
186	" "	1 1/4 & 1 1/2	1 5/16 & 1 9/16	24	3/4	1.35	186
188	" "	1 3/8 & 1 1/2	1 7/16 & 1 9/16	24	3/4	1.35	188

CAR WRENCHES

22 1-2° Angle, Double Head



Long Leverage

Unfinished are broached only.

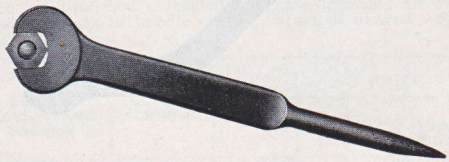
Semi-Finished are broached, case-hardened all over; heads not ground.

In Stock for U. S. Standard Nuts. See page 10 for special conditions.

Number	For U. S. Standard Nuts; Size Bolts	Openings	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	Number
367	**3/8 & 1/2**	23/32 & 29/32	12	7/16 & 1/2	$.50	$.75	**367**
370	**1/2 & 5/8**	15/16 & 1 1/8	19	1/2 & 1/2	.85	1.28	**370**
371	**1/2 & 3/4**	15/16 & 1 5/16	19	1/2 & 1/2	.85	1.28	**371**
372	**1/2 & 7/8**	15/16 & 1 1/2	20	1/2 & 9/16	.92	1.38	**372**
373	**5/8 & 3/4**	1 1/8 & 1 5/16	20	1/2 & 1/2	.92	1.38	**373**
374	**5/8 & 7/8**	1 1/8 & 1 1/2	21	1/2 & 9/16	1.00	1.50	**374**
375	**5/8 & 1**	1 1/8 & 1 11/16	21	1/2 & 9/16	1.00	1.50	**375**
376	**3/4 & 7/8**	1 5/16 & 1 1/2	21	1/2 & 9/16	1.00	1.50	**376**
377	**3/4 & 1**	1 5/16 & 1 11/16	22	1/2 & 9/16	1.10	1.65	**377**
378	**3/4 & 1 1/8**	1 5/16 & 1 7/8	22	1/2 & 5/8	1.10	1.65	**378**
379	**7/8 & 1**	1 1/2 & 1 11/16	22	9/16 & 9/16	1.10	1.65	**379**
380	**7/8 & 1 1/8**	1 1/2 & 1 7/8	23	9/16 & 5/8	1.23	1.85	**380**
381	**7/8 & 1 1/4**	1 1/2 & 2 1/16	23	9/16 & 5/8	1.23	1.85	**381**
382	**1 & 1 1/8**	1 11/16 & 1 7/8	23	9/16 & 5/8	1.23	1.85	**382**
383	**1 & 1 1/4**	1 11/16 & 2 1/16	24	9/16 & 5/8	1.40	2.10	**383**
385	**1 1/8 & 1 1/4**	1 7/8 & 2 1/16	24	5/8 & 5/8	1.40	2.10	**385**
387	**1 1/8 & 1 1/2**	1 7/8 & 2 7/16	25	5/8 & 3/4	1.70	2.55	**387**
389	**1 1/4 & 1 1/2**	2 1/16 & 2 7/16	25	5/8 & 3/4	1.70	2.55	**389**

CONSTRUCTION WRENCHES

15° Angle



The tang is for bringing bolt-holes into line and for insertion into convenient openings when wrench is not in use, preventing loss and keeping tool in sight.

In Stock with opening for U. S. and Whitworth Standard Finished Nuts; Metric Measure or special openings milled to order. See page 10 for special conditions and various styles of finish. These wrenches in the Semi-finished condition are case-hardened all over, but heads are not ground.

Number	For U. S. Standard Nut; Size Bolt	Opening, Milled	Extreme Length	Thickness Heads	PRICE			Number
					Unfinished	Semi-finished	Finished	
221	**1/4**	1/2	8	3/8	$.16	$.24	$.32	**221**
222	**5/16**	19/32	8	3/8	.16	.24	.32	**222**
223	**3/8**	11/16	9 1/2	7/16	.20	.30	.40	**223**
224	**7/16**	25/32	9 1/2	7/16	.20	.30	.40	**224**
225	**1/2**	7/8	11	1/2	.35	.53	.70	**225**
226	**9/16**	31/32	11	1/2	.35	.53	.70	**226**
227	**5/8**	1 1/16	13	9/16	.50	.75	1.00	**227**
228	**3/4**	1 1/4	15	5/8	.65	.97	1.30	**228**
229	**7/8**	1 7/16	17	11/16	.85	1.28	1.70	**229**
230	**1**	1 5/8	19	3/4	1.10	1.65	2.20	**230**

STRUCTURAL WRENCHES

Straight Opening

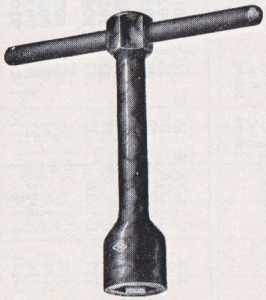


The tang is for bringing bolt-holes into line and for insertion into convenient openings when wrench is not in use, preventing loss and keeping tool in sight.

In Stock with openings for U. S. Standard Rough Nuts. See page 10 for special conditions and various styles of finish. These wrenches in the Semi-finished condition are case-hardened all over, but heads are not ground.

Number	For U. S. Standard Nut; Size Bolt	Opening	Extreme Length	Thickness Heads	Handle Offset	PRICE Unfinished	PRICE Semi-finished	Number
901	**1/4**	17/32	8	3/8	13/16	$.16	$.24	**901**
902	**5/16**	5/8	8	3/8	13/16	.16	.24	**902**
903	**3/8**	23/32	9 1/2	7/16	7/8	.20	.30	**903**
904	**7/16**	13/16	9 1/2	7/16	7/8	.20	.30	**904**
905	**1/2**	29/32	11	1/2	1	.35	.53	**905**
906	**9/16**	1	11	1/2	1 1/16	.35	.53	**906**
907	**5/8**	1 7/64	13	5/8	1 1/8	.50	.75	**907**
908	**3/4**	1 19/64	15	11/16	1 1/4	.65	.97	**908**
909	**7/8**	1 1/2	17	3/4	1 5/16	.85	1.28	**909**
910	**1**	1 11/16	19	13/16	1 3/8	1.10	1.65	**910**

SINGLE HEAD SOCKET WRENCHES



With or Without Handle
For Hexagon Nuts and Cap Screws

Unfinished are broached only.

Semi-Finished are broached, edges ground and case-hardened all over.

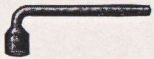
Finished are broached, polished all over, case-hardened and lacquered.

In Stock with openings for U. S. Standard dimensions; special broaching to order in reasonable quantities. See page 10 for special conditions and various styles of finish.

Hexagon end of shank is designed for use in combination with another wrench or with Pin-Handle.

Wrenches of shorter or longer lengths than stated in table can be furnished to order in quantities.

Unless otherwise specified, wrenches with Pin-Handles will be sent.



A full line of this Offset form of Socket Wrench adapted for Square and Hexagon Nuts, Cap and Set Screws can be furnished to order in reasonable quantities.

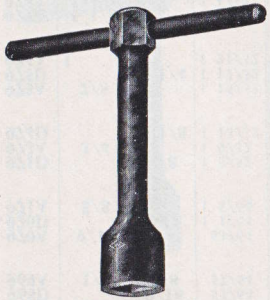
Number	HEXAGON OPENINGS: For U. S. Standard Nut; Size Bolt	HEXAGON OPENINGS: For Cap Screw; Diam. Screw	HEXAGON OPENINGS: Short Diam. Broached Opening	Extreme Length	Diam. of Head	Diam. of Shank	Hex. End same size as U. S. Nut; for Size Bolt	Size of Pin-Handle: Diam.	Size of Pin-Handle: Length	PRICE: Unfinished: Without Pin-Handle or Hole for same	PRICE: Unfinished: With Pin-Handle and Hole for same	PRICE: Semi-finished: Without Pin-Handle or Hole for same	PRICE: Semi-finished: With Pin-Handle and Hole for same	PRICE: Finished: Without Pin-Handle or Hole for same	PRICE: Finished: With Pin-Handle and Hole for same	Number
961A	**1/8**		21/64	4	1/2	1/4	3/16	3/16	4	$. 20	$.30	$.30	$.40	$.40	$.50	**961A**

962D		3/16	25/64	4 1/2	5/8	3/8	1/4	7/32	4 1/2	$.22	$.33	$.33	$.44	$.44	$.55	**962D**
963A	3/16		27/64	4 7/8	11/16	3/8	5/16	9/32	5 1/8	.24	.37	.36	.49	.48	.61	**963A**
963D		1/4	29/64	4 7/8	11/16	3/8	5/16	9/32	5 1/8	.24	.37	.36	.49	.48	.61	**963D**
964A	1/4	5/16	33/64	5 1/4	3/4	3/8	5/16	9/32	5 1/8	.26	.39	.39	.52	.52	.65	**964A**
965D		3/8	37/64	5 3/4	7/8	7/16	3/8	5/16	5 3/4	.29	.43	.44	.58	.58	.72	**965D**
965A	5/16		39/64	5 3/4	7/8	7/16	3/8	5/16	5 3/4	.29	.43	.44	.58	.58	.72	**965A**
966D		7/16	41/64	6 1/8	1	1/2	7/16	11/32	6 1/8	.32	.47	.48	.63	.64	.79	**966D**
967A	3/8		45/64	6 1/2	1 1/8	9/16	1/2	13/32	6 3/4	.36	.53	.54	.71	.72	.89	**967A**
967D		1/2	49/64	6 1/2	1 1/8	9/16	1/2	13/32	6 3/4	.36	.53	.54	.71	.72	.89	**967D**
968A	7/16		51/64	7	1 1/4	5/8	1/2	13/32	6 3/4	.40	.57	.60	.77	.80	.97	**968A**
968D		9/16	53/64	7	1 1/4	5/8	1/2	13/32	6 3/4	.40	.57	.60	.77	.80	.97	**968D**
969A	1/2	5/8	57/64	7 3/8	1 3/8	5/8	9/16	7/16	7 3/8	.46	.64	.69	.87	.92	1.10	**969A**
970A	9/16		63/64	7 7/8	1 1/2	11/16	5/8	1/2	8 1/8	.52	.72	.78	.98	1.04	1.24	**970A**
970D		3/4	1 1/64	7 7/8	1 1/2	11/16	5/8	1/2	8 1/8	.52	.72	.78	.98	1.04	1.24	**970D**
971A	5/8		1 5/64	8 1/4	1 5/8	3/4	5/8	1/2	8 1/8	.60	.80	.90	1.10	1.20	1.40	**971A**
971D		7/8	1 5/32	8 1/4	1 5/8	3/4	5/8	1/2	8 1/8	.60	.80	.90	1.10	1.20	1.40	**971D**
973A	3/4	1	1 9/32	9 1/8	1 7/8	7/8	3/4	5/8	9 1/8	.80	1.10	1.20	1.50	1.60	1.90	**973A**
974D		1 1/8	1 13/32	9 1/2	2	15/16	7/8	11/16	9 1/2	.90	1.25	1.35	1.70	1.80	2.15	**974D**
975A	7/8		1 15/32	10	2 1/8	1	7/8	11/16	9 1/2	1.00	1.35	1.50	1.85	2.00	2.35	**975A**
975D		1 1/4	1 17/32	10	2 1/8	1	7/8	11/16	9 1/2	1.00	1.35	1.50	1.85	2.00	2.35	**975D**
976A	1		1 21/32	10 3/8	2 1/4	1 1/16	1	3/4	10 3/8	1.15	1.55	1.72	2.12	2.30	2.70	**976A**
977A	1 1/8		1 27/32	10 7/8	2 1/2	1 1/8	1 1/8	13/16	10 7/8	1.30	1.75	1.95	2.40	2.60	3.05	**977A**
978A	1 1/4		2 1/32	11 3/8	2 3/4	1 3/16	1 1/8	13/16	10 7/8	1.60	2.05	2.40	2.85	3.20	3.65	**978A**
979A	1 3/8		2 7/32	11 7/8	3	1 1/4	1 1/4	7/8	11 7/8	2.10	2.60	3.15	3.65	4.20	4.70	**979A**
980A	1 1/2		2 13/32	12 1/2	3 5/16	1 3/8	1 3/8	1	12 1/2	2.80	3.45	4.20	4.85	5.60	6.25	**980A**

SINGLE HEAD SOCKET WRENCHES

With or Without Handle

For Square Nuts, Cap Screws and Set Screws



Unfinished are broached only.

Semi-Finished are broached, edges ground and case-hardened all over.

Finished are broached, polished all over, case-hardened and lacquered.

In Stock with openings for U. S. Standard dimensions; special broaching to order in reasonable quantities. See page 10 for special conditions and various styles of finish.

Hexagon end of shank is designed for use in combination with another wrench or with Pin-Handle.

Wrenches of shorter or longer lengths than stated in table can be furnished to order in quantities.

Unless otherwise specified, wrenches with Pin-Handles will be sent.



A full line of this Offset form of Socket Wrench adapted for Square and Hexagon Nuts, Cap and Set Screws can be furnished to order in reasonable quantities.

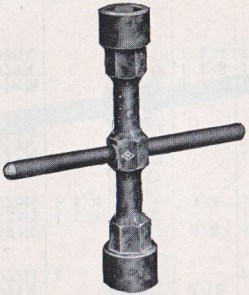
Number	SQUARE OPENINGS: For Set Screw; Size	For Cap Screw; Diam. Screw	For U. S. Standard Nut; Size Bolt	Short Diam. Broached Opening	Extreme Length	Diam. of Head	Diam of Shank	Hex. End same size as U. S Nut; for Size Bolt	Size of Pin-Handle: Diam.	Size of Pin-Handle: Length	PRICE: Unfinished: Without Pin-Handle or Hole for same	PRICE: Unfinished: With Pin-Handle and Hole for same	PRICE: Semi-finished: Without Pin-Handle or Hole for same	PRICE: Semi-finished: With Pin-Handle and Hole for same	PRICE: Finished: Without Pin-Handle or Hole for same	PRICE: Finished: With Pin-Handle and Hole for same
960H	**1/8**			1/8	3 5/8	11/32	7/32	1/8	1/8	3	$.18	$.26	$.27	$.35	$.36	$.44

961H	3/16			13/64	4	1/2	1/4	3/16	3/16	4	.20	.30	.30	.40	.40	.50	
961J	1/4			17/64	4	1/2	1/4	3/16	3/16	4	.20	.30	.30	.40	.40	.50	
962H	5/16			21/64	4 1/2	5/8	3/8	1/4	7/32	4 1/2	.22	.33	.33	.44	.44	.55	
963H	3/8	1/4		25/64	4 7/8	11/16	3/8	5/16	9/32	5 1/8	.24	.37	.36	.49	.48	.61	
965H	7/16	5/16		29/64	5 3/4	7/8	7/16	3/8	5/16	5 3/4	.29	.43	.44	.58	.58	.72	
966H	1/2	3/8	1/4	33/64	6 1/8	1	1/2	7/16	11/32	6 1/8	.32	.47	.48	.63	.64	.79	
967H	9/16	7/16		37/64	6 1/2	1 1/8	9/16	1/2	13/32	6 3/4	.36	.53	.54	.71	.72	.89	
967X			5/16	39/64	6 1/2	1 1/8	9/16	1/2	13/32	6 3/4	.36	.53	.54	.71	.72	.89	
968H	5/8	1/2		41/64	7	1 1/4	5/8	1/2	13/32	6 3/4	.40	.57	.60	.77	.80	.97	
968M		9/16	3/8	45/64	7	1 1/4	5/8	1/2	13/32	6 3/4	.40	.57	**.60**	**.77**	.80	.97	
969H	3/4	5/8		49/64	7 3/8	1 3/8	5/8	9/16	7/16	7 3/8	.46	.64	**.69**	**.87**	.92	1.10	
970X			7/16	51/64	7 7/8	1 1/2	11/16	5/8	1/2	8 1/8	.52	.72	**.78**	.98	1.04	1.24	
971H	7/8	3/4	1/2	57/64	8 1/4	1 5/8	3/4	5/8	1/2	8 1/8	.60	.80	.90	1.10	1.20	1.40	
971X			9/16	63/64	8 1/4	1 5/8	3/4	5/8	1/2	8 1/8	60	.80	.90	1 10	1.20	1 40	
973H	1			1 1/64	9 1/8	1 7/8	7/8	3/4	5/8	9 1/8	.80	1.10	1.20	1.50	1.60	1.90	
974X			5/8	1 5/64	9 1/2	2	15/16	7/8	11/16	9 1/2	.90	1.25	1.35	1 70	1 80	2.15	
974H	1 1/8	7/8		1 5/32	9 1/2	2	15/16	7/8	11/16	9 1/2	.90	1.25	1.35	1.70	1 80	2.15	
976H	1 1/4	1	3/4	1 9/32	10 3/8	2 1/4	1 1/16	1	3/4	10 3/8	1.15	1.55	1.72	2.12	2.30	2.70	
977M		1 1/8		1 13/32	10 7/8	2 1/2	1 1/8	1 1/8	13/16	10 7/8	1.30	1.75	1.95	2.40	2.60	3.05	
977X			7/8	1 15/32	10 7/8	2 1/2	1 1/8	1 1/8	13/16	10 7/8	1.30	1.75	1.95	2.40	2.60	3 05	
977O		1 1/4		1 17/32	10 7/8	2 1/2	1 1/8	1 1/8	13/16	10 7/8	1.30	1.75	1.95	2.40	2.60	3.05	
978M		1 3/8	1	1 21/32	11 3/8	2 3/4	1 3/16	1 1/8	13/16	10 7/8	1.60	2.05	2.40	2.85	3 20	3 65	
979X			1 1/8	1 27/32	11 7/8	3	1 1/4	1 1/4	7/8	11 7/8	2.10	2.60	3.15	3.65	4.20	4.70	
980X			1 1/4	2 1/32	12 1/2	3 5/16	1 3/8	1 3/8	1	12 1/2	2 80	3.45	4.20	4.85	5 60	6.25	

DOUBLE HEAD SOCKET WRENCHES

With or Without Handle

For Hexagon Nuts and Cap Screws



Unfinished are broached only.

Semi-Finished are broached, edges ground and case-hardened all over.

Finished are broached, polished all over, case-hardened and lacquered.

In Stock with openings for U. S. Standard dimensions; special broaching to order in reasonable quantities. See page 10 for special conditions and various styles of finish.
Hexagon end of shank is designed for use in combination with another wrench or with Pin-Handle.
Unless otherwise specified, wrenches with Pin-Handles will be sent.





Illustrations only; mdse. not for sale.

Number	HEXAGON OPENINGS: For U. S. Standard Nuts Size Bolts	HEXAGON OPENINGS: For Cap Screws Diameter Screws	HEXAGON OPENINGS: Short Diameter Broached Openings	Extreme Leng'h	Diameter of Head	Dia of Sh'k	Hex. Part of Sh k same size as U. S. Nut for Size Bolt	Size of Pin-Handle: Dia.	Size of Pin-Handle: Leng'h	PRICE: Unfinished: Without Pin-Handle or Hole	PRICE: Unfinished: With Pin-Handle and Hole	PRICE: Semi-finished: Without Pin-Handle or Hole	PRICE: Semi-finished: With Pin-Handle and Hole	PRICE: Finished: Without Pin-Handle or Hole	PRICE: Finished: With Pin-Handle and Hole
340A	**1/8 & 3/16**		21/64 & 27/64	4 7/8	9/16 & 11/16	3/8	1/4	7/32	4 1/2	$.35	$.46	$.53	$.64	$.70	$.81
342A	**1/8 & 1/4**		21/64 & 33/64	6 1/4	3/4 & 7/8	1/2	5/16	9/32	5 1/8	.45	.58	.68	.81	.90	1.03
342B	**3/16 & 1/4**		27/64 & 33/64							.45	.58	.68	.81	.90	1.03
342C		**3/16 & 1/4**	25/64 & 29/64							.45	.58	.68	.81	.90	1.03
342D		**3/16 & 5/16**	25/64 & 33/64							.45	.58	.68	.81	.90	1.03
342E		**1/4 & 5/16**	29/64 & 33/64	6 1/4	3/4 & 7/8	1/2	5/16	9/32	5 1/8	.45	.58	.68	.81	.90	1.03
342H	**3/16 & 5/16**		27/64 & 39/64							.45	.58	.68	.81	.90	1.03
342I	**1/4 & 5/16**		33/64 & 39/64							.45	.58	.68	.81	.90	1.03
342J		**1/4 & 3/8**	29/64 & 37/64							.45	.58	.68	.81	.90	1.03
342K		**5/16 & 3/8**	33/64 & 37/64							.45	.58	.68	.81	.90	1.03

												$	$	$	$	$	$	
344A	1/4 & 3/8		33/64 & 45/64	7 3/4	1 1/8 & 1 9/32	5/8	1/2	13/32	6 3/4	.65	.82	.97	1.14	1.30	1.47			
344B	5/16 & 3/8		39/64 & 45/64							.65	.82	.97	1.14	1.30	1.47			
344C	5/16 & 7/16		39/64 & 51/64							.65	.82	.97	1.14	1.30	1.47			
344D		5/16 & 7/16	33/64 & 41/64							.65	.82	.97	1.14	1.30	1.47			
344E		3/8 & 7/16	37/64 & 41/64							.65	.82	.97	1.14	1.30	1.47			
344F		3/8 & 1/2	37/64 & 49/64							.65	.82	.97	1.14	1.30	1.47			
344J	3/8 & 7/16		45/64 & 51/64							.65	.82	.97	1.14	1.30	1.47			
344K	3/8 & 1/2		45/64 & 57/64							.65	.82	.97	1.14	1.30	1.47			
344V		7/16 & 1/2	41/64 & 49/64							.65	.82	.97	1.14	1.30	1.47			
344L		7/16 & 9/16	41/64 & 53/64							.65	.82	.97	1.14	1.30	1.47			
344M		7/16 & 5/8	41/64 & 57/64							.65	.82	.97	1.14	1.30	1.47			
344N		1/2 & 9/16	49/64 & 53/64							.65	.82	.97	1.14	1.30	1.47			
344O		1/2 & 5/8	49/64 & 57/64							.65	.82	.97	1.14	1.30	1.47			
346A	7/16 & 1/2		51/64 & 57/64	9 1/4	1 1/2 & 1 21/32	3/4	5/8	1/2	8 1/8	.95	1.15	1.43	1.63	1.90	2.10			
346B	7/16 & 9/16		51/64 & 63/64							.95	1.15	1.43	1.63	1.90	2.10			
346C	1/2 & 9/16		57/64 & 63/64							.95	1.15	1.43	1.63	1.90	2.10			
346D		9/16 & 5/8	53/64 & 57/64							.95	1.15	1.43	1.63	1.90	2.10			
346E		9/16 & 3/4	53/64 & 1 1/64							.95	1.15	1.43	1.63	1.90	2.10			
346F		5/8 & 3/4	57/64 & 1 1/64							.95	1.15	1.43	1.63	1.90	2.10			
346M	1/2 & 5/8		57/64 & 1 5/64							.95	1.15	1.43	1.63	1.90	2.10			
346N	9/16 & 5/8		63/64 & 1 5/64							.95	1.15	1.43	1.63	1.90	2.10			
346O		5/8 & 7/8	57/64 & 1 5/32							.95	1.15	1.43	1.63	1.90	2.10			
346P		3/4 & 7/8	1 1/64 & 1 5/32							.95	1.15	1.43	1.63	1.90	2.10			
348A	9/16 & 3/4		63/64 & 1 9/32	11	1 7/8 & 2 3/16	1	7/8	11/16	9 1/2	1.60	1.95	2.40	2.75	3.20	3.55			
348B	5/8 & 3/4		1 5/64 & 1 9/32							1.60	1.95	2.40	2.75	3.20	3.55			
348C		3/4 & 1	1 1/64 & 1 9/32							1.60	1.95	2.40	2.75	3.20	3.55			
348D		7/8 & 1	1 5/32 & 1 9/32							1.60	1.95	2.40	2.75	3.20	3.55			
348K	5/8 & 7/8		1 5/64 & 1 15/32							1.60	1.95	2.40	2.75	3.20	3.55			
348L	3/4 & 7/8		1 9/32 & 1 15/32							1.60	1.95	2.40	2.75	3.20	3.55			
348M		7/8 & 1 1/8	1 5/32 & 1 13/32							1.60	1.95	2.40	2.75	3.20	3.55			
348N		1 & 1 1/8	1 9/32 & 1 13/32							1.60	1.95	2.40	2.75	3.20	3.55			
350A	3/4 & 1		1 9/32 & 1 21/32	13 1/4	2 1/2 & 2 13/16	1 1/4	1 1/4	7/8	11 7/8	2.80	3.30	4.20	4.70	5.60	6.10			
350B	7/8 & 1		1 15/32 & 1 21/32							2.80	3.30	4.20	4.70	5.60	6.10			
350C		1 & 1 1/4	1 9/32 & 1 17/32							2.80	3.30	4.20	4.70	5.60	6.10			
350D		1 1/8 & 1 1/4	1 13/32 & 1 17/32							2.80	3.30	4.20	4.70	5.60	6.10			
350K	7/8 & 1 1/8		1 15/32 & 1 27/32							2.80	3.30	4.20	4.70	5.60	6.10			
350L	1 & 1 1/8		1 21/32 & 1 27/32							2.80	3.30	4.20	4.70	5.60	6.10			
350M	1 & 1 1/4		1 21/32 & 2 1/32							2.80	3.30	4.20	4.70	5.60	6.10			
350N	1 1/8 & 1 1/4		1 27/32 & 2 1/32							2.80	3.30	4.20	4.70	5.60	6.10			

PIN SPANNERS



Unfinished are plain forgings.

Semi-Finished have pins milled, edges ground, and are case-hardened all over.

Finished have pins milled and are polished and case-hardened all over and lacquered.

Number	Old Number	For Circle Diameter	Extreme Length	Finished Diameter Pin	PRICE			Number
					Unfinished	Semi-finished	Finished	
452	204	**1**	4	3/16	$.18	$.27	$.36	**452**
453	205	**1 1/4**	4 1/2	13/64	.19	.29	.38	**453**
454	206	**1 1/2**	5	7/32	.20	.30	.40	**454**
455	207	**1 3/4**	5 1/2	15/64	.21	.31	.42	**455**
456	208	**2**	6	1/4	.22	.33	.44	**456**
457	209	**2 1/4**	6 1/2	17/64	.23	.35	.46	**457**
458	210	**2 1/2**	7	9/32	.24	.36	.48	**458**
459	211	**2 3/4**	7 1/2	19/64	.26	.39	.52	**459**
460	212	**3**	8	5/16	.28	.42	.56	**460**
461	213	**3 1/4**	8 1/2	21/64	.30	.45	.60	**461**
462	214	**3 1/2**	9	11/32	.32	.48	.64	**462**
463	215	**3 3/4**	9 1/2	23/64	.34	.51	.68	**463**
464	216	**4**	10	3/8	.36	.54	.72	**464**
466	218	**5**	12	7/16	.48	.72	.96	**466**
468	220	**6**	14	1/2	.65	.98	1.30	**468**

LIGHT HOOK SPANNERS

Unfinished Only



Length of handle can be varied if desired

Number	Old Number	For Circle; Diameter	Extreme Length	Hook			Diameter Handle	PRICE each	Number
				Length	Width	Thickness			
491	308	**1 3/16**	6 1/2	1/16	3/8	3/16	3/8	$.12	**491**
493	310	**1 3/4**	7 1/2	1/8	3/8	3/16	3/8	.14	**493**
494	311	**2 1/8**	8	1/8	3/8	3/16	3/8	.15	**494**
495	312	**2 1/2**	8 1/4	1/8	3/8	3/16	3/8	.16	**495**
496	313	**2 3/4**	8 1/2	1/8	3/8	3/16	3/8	.18	**496**
497	314	**3**	8 3/4	1/8	3/8	3/16	3/8	.20	**497**
498	315	**3 1/2**	9	1/8	3/8	3/16	3/8	.22	**498**

HOOK SPANNERS

Unfinished Only



The diameter of circle which the unfinished forgings fit is given in second column of table, but wrenches will finish to sizes stated in third column.

Number	Forgings for Circle; Diameter	Forgings will finish for Circles; Diameter	Extreme Length	Thickness	PRICE each	Number
403	**1 1/4**	1 to 1 1/4	4 3/4	7/32	$.20	**403**
404	**1 1/2**	1 3/8 to 1 5/8	6	1/4	.23	**404**
405	**2**	1 3/4 to 2	7 1/8	1/4	.26	**405**
406	**2 1/4**	2 1/8 to 2 3/8	8 7/16	1/4	.30	**406**
407	**2 5/8**	2 1/2 to 2 3/4	9 3/4	1/4	.34	**407**
408	**3 1/8**	2 7/8 to 3 1/4	10 7/8	5/16	.40	**408**
409	**3 3/4**	3 3/8 to 3 7/8	12	5/16	.48	**409**
410	**4 3/8**	4 to 4 1/2	13	5/16	.58	**410**
412	**5 3/4**	5 1/4 to 5 3/4	15	7/16	.85	**412**

FACE SPANNERS



Unfinished are plain forgings but have pins milled.

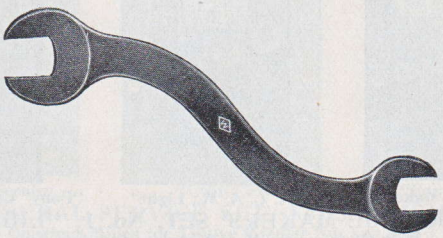
Semi-Finished have pins milled, the edges ground and are case-hardened all over.

Finished have pins milled, and are polished, case-hardened and lacquered all over. The pins are forged integral with the wrench.

No.	Pins			Span of Jaws in Clear	Length from C of Pins	Thickness	PRICE			No.
	Distance C to C	Diam Milled	Length				Unfinished	Semi-finished	Finished	
418	**1**	3/16	3/16	11/16	4 1/2	3/16	$.15	$.22	$.30	**418**
420	**1 1/4**	7/32	7/32	29/32	5	3/16	.17	.26	.34	**420**
422	**1 1/2**	7/32	7/32	1 1/8	5 1/2	3/16	.19	.28	.38	**422**
424	**1 3/4**	7/32	7/32	1 3/8	6	7/32	.22	.33	.44	**424**
426	**2**	1/4	1/4	1 5/8	6 1/2	7/32	.25	.38	.50	**426**
428	**2 1/4**	1/4	1/4	1 7/8	7	7/32	.29	.43	.58	**428**
430	**2 1/2**	9/32	9/32	2 3/32	7 1/2	1/4	.33	.50	.66	**430**
432	**2 3/4**	9/32	9/32	2 11/32	8	1/4	.38	.57	.76	**432**
434	**3**	5/16	5/16	2 19/32	8 1/2	1/4	.43	.64	.86	**434**
436	**3 1/4**	5/16	5/16	2 13/16	9 1/8	1/4	.49	.74	.98	**436**
438	**3 1/2**	5/16	5/16	3 1/32	9 3/4	1/4	.55	.82	1.10	**438**
440	**3 3/4**	3/8	3/8	3 1/4	10 3/8	1/4	.62	.93	1.24	**440**
442	**4**	3/8	3/8	3 7/16	11	1/4	.70	1.05	1.40	**442**

CARRIAGE MAKERS' OR LIGHT SERVICE WRENCHES

22 1-2° Angle, Double Head



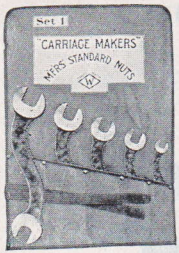
Long and Light

In Stock with openings for Manufacturers' Standard Nuts; U. S. Standard and special milling to order. See page 10 for special conditions and various styles of finish. These wrenches can be furnished from stock in boxes or canvas rolls and milled to any combination of openings shown below. For desirable selections in sets see pages 52, 53, and 56.

Number	Old Number	Openings Milled	Extreme Length	Thickness Heads	PRICE			Number
					Unfinished	Semi-finished	Finished	
675B	475B	**3/8 & 7/16**	6 1/4	7/32	$.13	$.20	$.26	**675B**
675A	475A	**3/8 & 1/2**	6 1/4	7/32	.13	.20	.26	**675A**
675	475	**13/32 & 1/2**	6 1/4	7/32	.13	.20	.26	**675**
677B	477B	**1/2 & 9/16**	7 1/8	1/4	.17	.25	.34	**677B**
677	477	**1/2 & 5/8**	7 1/8	1/4	.17	.25	.34	**677**
679A	479A	**9/16 & 11/16**	8 1/4	5/16	.22	.33	.44	**679A**
679	479	**5/8 & 11/16**	8 1/4	5/16	.22	.33	.44	**679**
681	481	**11/16 & 27/32**	9 1/4	3/8	.28	.42	.56	**681**
681B	481B	**3/4 & 13/16**	9 1/4	3/8	.28	.42	.56	**681B**
681A	481A	**3/4 & 7/8**	9 1/4	3/8	.28	.42	.56	**681A**
683	483	**27/32 & 15/16**	10 3/8	7/16	.34	.51	.68	**683**
683B	483B	**7/8 & 1**	10 3/8	7/16	.34	.51	.68	**683B**
683A	483A	**15/16 & 1**	10 3/8	7/16	.34	.51	.68	**683A**
685	485	**1 & 1 1/8**	12	1/2	.44	.66	.88	**685**
685A	485A	**1 & 1 1/4**	12	1/2	.44	.66	.88	**685A**
685C	485C	**1 1/16 & 1 1/4**	12	1/2	.44	.66	.88	**685C**
685B	485B	**1 1/8 & 1 1/4**	12	1/2	.44	.66	.88	**685B**

SUPERIOR DROP-FORGED WRENCH SETS

For Light Work Only



"Carriage Makers"



"A. L. A. M., Light"



"Pony" Carriage Makers

CARRIAGE MAKERS' SET, No. 1, "LIGHT"

With Openings for Manufacturers' Standard Nuts

Number	Old Number	For Manufacturers' Standard Nuts; Size Bolts	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
675	475	**3/16 & 1/4**	13/32 & 1/2	6 1/4	7/32	$.13	$.20	$.26	**675**
677	477	**1/4 & 5/16**	1/2 & 5/8	7 1/8	1/4	.17	.25	.34	**677**
679	479	**5/16 & 3/8**	5/8 & 11/16	8 1/4	5/16	.22	.33	.44	**679**
681	481	**3/8 & 7/16**	11/16 & 27/32	9 1/4	3/8	.28	.42	.56	**681**
683	483	**7/16 & 1/2**	27/32 & 15/16	10 3/8	7/16	.34	.51	.68	**683**
No. 1	Set	List Price of Roll, $.45 extra				$1.14	$1.71	$2.28	**No. 1**

AUTOMOBILE SET, No. 2, "LIGHT"

With Openings for A. L. A. M. Standard Nuts and Cap Screws

Number	Old Number	For A.L.A.M. Standard Nuts and Cap Screws; Size Bolt or Screw	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
675A	475A	**1/4 & 5/16**	3/8 & 1/2	6 1/4	7/32	$.13	$.20	$.26	**675A**
679A	479A	**3/8 & 7/16**	9/16 & 11/16	8 1/4	5/16	.22	.33	.44	**679A**
681A	481A	**1/2 & 9/16**	3/4 & 7/8	9 1/4	3/8	.28	.42	.56	**681A**
683A	483A	**5/8 & 11/16**	15/16 & 1	10 3/8	7/16	.34	.51	.68	**683A**
685B	485B	**3/4 & 7/8**	1 1/8 & 1 1/4	12	1/2	.44	.66	.88	**685B**
No. 2	Set	List Price of Roll, $.45 extra				$1.41	$2.12	$2.82	**No. 2**

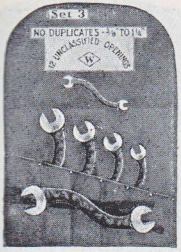
"PONY" CARRIAGE MAKERS' SET, No. 21, "LIGHT"

With Openings for Manufacturers' Standard Nuts

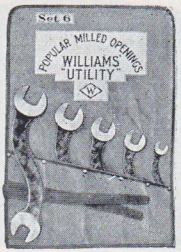
Number	Old Number	For Manufacturers' Standard Nuts; Size Bolts	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
675	475	**3/16 & 1/4**	13/32 & 1/2	6 1/4	7/32	$.13	$.20	$.26	**675**
679	479	**5/16 & 3/8**	5/8 & 11/16	8 1/4	5/16	.22	.33	.44	**679**
683	483	**7/16 & 1/2**	27/32 & 15/16	10 3/8	7/16	.34	.51	.68	**683**
No. 21	Set	List Price of Roll, $.35 extra				$.69	$1.04	$1.38	**No. 21**

SUPERIOR DROP-FORGED WRENCH SETS

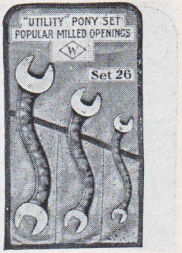
For Light Work Only



General Service



"Utility Five"



"Pony Utility"

GENERAL SERVICE SET, No. 3, "LIGHT"

With Openings Milled for Twelve Popular Nut and Screw Sizes

Number	Old Number	For Unclassified Nuts or Screws	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
675B	475B	Twelve	3/8 & 7/16	6 1/4	7/32	$.13	$.20	$.26	**675B**
677B	477B	Popular	1/2 & 9/16	7 1/8	1/4	.17	.25	.34	**677B**
679B	479B	Milled	5/8 & 11/16	8 1/4	5/16	.22	.33	.44	**679B**
681B	481B	Openings—	3/4 & 13/16	9 1/4	3/8	.28	.42	.56	**681B**
683B	483B	No	7/8 & 1	10 3/8	7/16	.34	.51	.68	**683B**
685B	485B	Duplicates	1 1/8 & 1 1/4	12	1/2	.44	.66	.88	**685B**
No. 3	set	List Price of Roll, $.45 extra				$1.58	$2.37	$3.16	**No. 3**

"UTILITY" SET, No. 6, "LIGHT"

With Openings Milled for "Nut Measure" Instead of Bolt Size

Number	Old Number	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
675A	475A	**3/8 & 1/2**	6 1/4	7/32	$.13	$.20	$.26	**675A**
677	477	**1/2 & 5/8**	7 1/8	1/4	.17	.25	.34	**677**
679C	479C	**5/8 & 3/4**	8 1/4	5/16	.22	.33	.44	**679C**
681A	481A	**3/4 & 7/8**	9 1/4	3/8	.28	.42	.56	**681A**
683B	483B	**7/8 & 1**	10 3/8	7/16	.34	.51	.68	**683B**
No. 6	**No. 11**	List Price of Roll, $.45 extra			$1.14	$ 1.71	$2.28	**No. 6**

"PONY UTILITY" SET, No. 26, "LIGHT"

With Openings Milled for Popular Sizes, Without Duplication

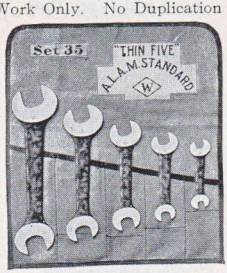
Number	Old Number	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
675A	475A	**3/8 & 1/2**	6 1/4	7/32	$.13	$.20	$.26	**675A**
679C	479C	**5/8 & 3/4**	8 1/4	5/16	.22	.33	.44	**679C**
683B	483B	**7/8 & 1**	10 3/8	7/16	.34	.51	.68	**683B**
No. 26	**No. 10**	List Price of Roll, $.35 extra			$.69	$1.04	$1.38	**No. 26**

SUPERIOR DROP-FORGED WRENCH SETS, "THIN"

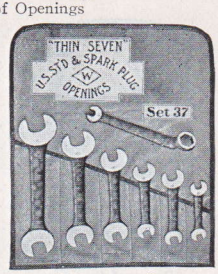
For Light Work Only. No Duplication of Openings



"Thin Six"



"Thin Five"



"Thin Seven"

"EXTRA CAPACITY" SET, "THIN SIX," No. 34

With Openings for Most Popular U. S. Standard Nuts and Cap Screws

Number	Nuts		Cap Screws		Openings, Milled	Extreme Length	Thickness Heads	PRICE		
	Small H'd	Large H'd	Small H'd	Large H'd				Unfinished	Semi-finished	Finished
623D		1/4	1/4	5/16	7/16 & 1/2	4 3/8	9/64 & 5/32	$.14	$.21	$.28
626X		3/8	3/8		9/16 & 11/16	5 1/2	5/32 & 3/16	.19	.28	.38
628	5/16	7/16			19/32 & 25/32	5 1/2	5/32 & 3/16	.19	.28	.38
629D			7/16	1/2	5/8 & 3/4	6 7/8	3/16 & 7/32	.25	.38	.50
634	1/2	5/8	5/8		7/8 & 1 1/16	8 1/2	7/32 & 9/32	.33	.50	.66
635E		3/4	3/4	1	1 & 1 1/4	10 3/8	9/32 & 5/16	.44	.66	.88
No. 34	Set		List Price of Roll, $.45 extra					$1.54	$2.31	$3.08

AUTOMOBILE SET WITH SPARK PLUG WRENCH, "THIN SEVEN," No. 37

With Openings for U. S. Standard Nuts, Cap Screws and Spark Plug, Etc.

Number	Nuts		Cap Screws		Openings, Milled	Extreme Length	Thickness Heads	PRICE		
	Small H'd	Large H'd	Small H'd	Large H'd				Unfinished	Semi-finished	Finished
623D		1/4	1/4	5/16	7/16& 1/2	4 3/8	9/64&5/32	$.14	$.21	$.28
626X		3/8	3/8		9/16& 11/16	5 1/2	5/32&3/16	.19	.28	.38
628	5/16	7/16			19/32& 25/32	5 1/2	5/32&3/16	.19	.28	.38
629D			7/16	1/2	5/8& 3/4	6 7/8	3/16&7/32	.25	.38	.50
634	1/2	5/8	5/8		7/8&1 1/16	8 1/2	7/32&9/32	.33	.50	.66
635E		3/4	3/4	1	1&1 1/4	10 3/8	9/32&5/16	.44	.66	.88
993 S.P.	ALAM 3/8	U.S. 1/2	3/8	S.P. 1/2	9/16& 7/8	8	5/16&1/2	.40	.60	.80
No. 37	Set		List Price of Roll, $.45 extra					$1.94	$2.91	$3.88

AUTOMOBILE SET, "THIN FIVE," No. 35

With Openings Milled for A. L. A. M. Standard Nuts and Cap Screws

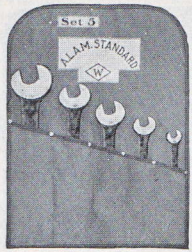
Number	A. L. A. M. Nuts and Cap Screws	Openings, Milled	Extreme Length	Thickness Heads	PRICE			Number
					Unfinished	Semi-finished	Finished	
623E	1/4 & 5/16	3/8 & 1/2	4 3/8	9/64 & 5/32	$.14	$.21	$.28	623E
626X	3/8 & 7/16	9/16 & 11/16	5 1/2	5/32 & 3/16	.19	.28	.38	626X
629E	1/2 & 9/16	3/4 & 7/8	6 1/2	3/16 & 7/32	.25	.38	.50	629E
632X	5/8 & 11/16	15/16 & 1	8 1/2	7/32 & 9/32	.33	.50	.66	632X
635G	3/4 & 7/8	1 1/8 & 1 1/4	10 3/8	9/32 & 5/16	.44	.66	.88	635G
No. 35	Set	List Price of Roll, $.45 extra			$1.35	$2.03	$2.70	No. 35

SUPERIOR DROP-FORGED WRENCH SETS

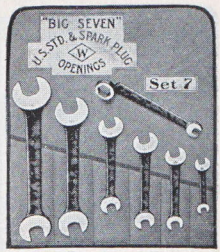
For Severe Service About Automobiles, Etc. No Duplication of Openings



"Big Six"



A. L. A. M.



"Big Seven"

ORIGINAL "EXTRA CAPACITY" SET, "BIG SIX," No. 4

With Openings Milled for Most Popular U. S. Standard Nuts and Cap Screws

Number	For Nuts Diam. Bolts		For Cap Scws. Diam. Scw.		Openings Milled U. S. Standard	Extreme L'gth	Thickness Heads	PRICE			Number
	Small H'd	Large H'd	Small H'd	Large H'd				Unfinished	Semi-finished	Finished	
725		1/4	1/4	5/16	7/16 & 1/2	4 7/8	9/32	$.18	$.27	$.36	725
27C		3/8	3/8		9/16 & 11/16	5 7/8	5/16	.22	.33	.44	27C
28	5/16	7/16			19/32 & 25/32	6 7/8	11/32	.24	.36	.48	28
729			7/16	1/2	5/8 & 3/4	6 7/8	11/32	.26	.39	.52	729
34	1/2	5/8	5/8		7/8 & 1 1/16	7 3/4	1/2	.40	.60	.80	34
736		3/4	3/4	1	1 & 1 1/4	11 1/2	9/16	.51	.77	1.02	736
No. 4	Set		List Price of Roll, $.45 extra					$1.81	$2.72	$3.62	No. 4

AUTOMOBILE "EXTRA CAPACITY" SET, "BIG SEVEN," No. 7

With Openings for U. S. Standard Nuts, Cap Screws and Spark Plug, Etc.

Number	Nuts		Cap Screws		Openings, Milled	Extreme L'gth	Thickness Heads	PRICE		
	Small H'd	Large H'd	Small H'd	Large H'd				Unfinished	Semi-finished	Finished
725		1/4	1/4	5/16	7/16& 1/2	4 7/8	9/32	$.18	$.27	$.36
27C		3/8	3/8		9/16& 11/16	5 7/8	5/16	.22	.33	.44
28	5/16	7/16			19/32& 25/32	6 7/8	11/32	.24	.36	.48
729			7/16	1/2	5/8& 3/4	6 7/8	11/32	.26	.39	.52
34	1/2	5/8	5/8		7/8&1 1/16	7 3/4	1/2	.40	.60	.80
736		3/4	3/4	1	1&1 1/4	11 1/2	9/16	.51	.77	1.02
993 S.P.	ALAM 3/8	U.S. 1/2	3/8	S.P. 1/2	9/16& 7/8	8	5/16&1/2	.40	.60	.80
No. 7	Set		List Price of Roll, $.45 extra					$2.21	$3.32	$4.42

AUTOMOBILE SET, NO. 5

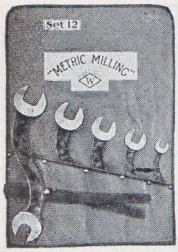
With Openings Milled for A. L. A. M. Standard Nuts and Cap Screws

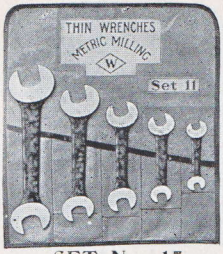
Number	For A.L.A.M. Standard Nuts and Cap Screws Diameter Bolts and Screws	Openings, Milled	Extreme Length	Thickness Heads	PRICE			Number
					Unfinished	Semi-finished	Finished	
723A	1/4 & 5/16	3/8 & 1/2	4	1/4	$.14	$.21	$.28	723A
27C	3/8 & 7/16	9/16 & 11/16	5 7/8	5/16	.22	.33	.44	27C
731A	1/2 & 9/16	3/4 & 7/8	7 3/4	13/32	.30	.45	.60	731A
33C	5/8 &11/16	15/16 & 1	8 3/4	7/16	.36	.54	.72	33C
737	3/4 & 7/8	1 1/8 & 1 1/4	11 1/2	9/16	.58	.87	1.16	737
No. 5	Set	List Price of Roll, $.45 extra			$1.60	$2.40	$3.20	No. 5

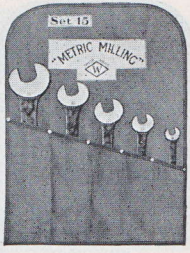
Omitting **No. 737** this set lists $1.02, $1.53, $2.04.

SUPERIOR DROP-FORGED WRENCH SETS

Milled with Metric Measure Openings







SET No. 15

Dependable tools selected from recognized standards of wrench-weights and design.

Number	Openings, Milled m/m	Extreme Length m/m	Thickness Heads m/m	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
23M	10 & 12	102	6.3	$.14	$.21	$.28	**23M**
27M	14 & 16	149	7.9	.22	.33	.44	**27M**
29M	18 & 20	175	8.7	.26	.39	.52	**29M**
33M	22 & 25	222	11.1	.36	.54	.72	**33M**
37M	28 & 30	292	14.2	.58	.87	1.16	**37M**
No. 15	Set	List Price of Roll, $.45 extra		$1.56	$2.34	$3.12	**No. 15**

SET No. 12

Selected from specially designed, lighter tools. Compact, convenient and serviceable.

Number	Openings, Milled m/m	Extreme Length m/m	Thickness Heads m/m	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
675M	10 & 12	159	5.5	$.13	$.20	$.26	**675M**
679M	14 & 16	210	7.9	.22	.33	.44	**679M**
681M	18 & 20	235	9.5	.28	.42	.56	**681M**
683M	22 & 25	264	11.1	.34	.51	.68	**683M**
685M	28 & 30	304	12.7	.44	.66	.88	**685M**
No. 12	Set	List Price of Roll, $.45 extra		$1.41	$2.12	$2.82	**No. 12**

SET No. 11. "THIN"

Selected from standard line of Check Nut Wrenches for lighter service on "thin" or regular thicknesses of Nuts, etc.

Number	Openings, Milled m/m	Extreme Length m/m	Thickness Heads m/m	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
623M	10 & 12	111	3.5 & 3.9	$.14	$.21	$.28	**623M**
626M	14 & 16	140	3.9 & 4.7	.19	.29	.38	**626M**
629M	18 & 20	174	4.7 & 5.5	.25	.38	.50	**629M**
632M	22 & 25	216	5.5 & 7.1	.33	.50	.66	**632M**
635M	28 & 30	264	7.1 & 7.9	.44	.66	.88	**635M**
No. 11	Set	List Price of Roll, $.45 extra		$1.35	$2.03	$2.70	**No. 11**

"RATCHO" WRENCHES

Straight Opening "Ratcho" Milled
For U. S. Standard Hexagon and Square Nuts and Cap Screws
For Automobile and Assembling Work

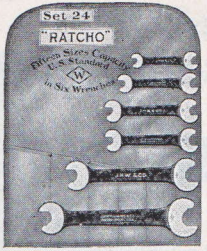


Patented

An ingenious form of opening makes this tool a genuine "Ratchetless Ratchet Wrench." It is free from all mechanism and without lifting the tool from the nut it will automatically release itself from the sides of nut or screws and on the return movement regrip them. The wrench can be used in either direction, but must be turned over for opposite rotation of nut. Its simplicity and rapidity in action are unique. See page 58 for selected set.

In Stock with openings milled for U. S. Standard Nuts and Cap Screws.

Number	For Nuts Diam. Bolts		For Cap Scws. Diam. Scws.		Openings, Milled U. S. Standard	Extreme Length	Th'kness H'ds	PRICE		Number
	Small Head	Large Head	Small Head	Large Head				Semi-finished	Finished	
1124	3/16	5/16			13/32 & 19/32	4 3/4	9/32	$.24	$.32	1124
1125	1/4	5/16			1/2 & 19/32	4 3/4	9/32	.27	.36	1125
1725			1/4	5/16	7/16 & 1/2	4 3/4	9/32	.27	.36	1725
1725A			1/4	3/8	7/16 & 9/16	4 3/4	9/32	.27	.36	1725A
1725B			5/16	3/8	1/2 & 9/16	4 3/4	9/32	.27	.36	1725B
1126	1/4	3/8			1/2 & 11/16	5 3/4	5/16	.30	.40	1126
1726			5/16	7/16	1/2 & 5/8	5 3/4	5/16	.30	.40	1726
1127	5/16	3/8			19/32 & 11/16	5 3/4	5/16	.33	.44	1127
1127C		3/8	3/8		9/16 & 11/16	5 3/4	5/16	.33	.44	1127C
1727			3/8	7/16	9/16 & 5/8	5 3/4	5/16	.33	.44	1727
1128	5/16	7/16			19/32 & 25/32	6 5/8	11/32	.36	.48	1128
1728			3/8	1/2	9/16 & 3/4	6 5/8	11/32	.36	.48	1728
1129	3/8	7/16			11/16 & 25/32	6 5/8	11/32	.39	.52	1129
1729			7/16	1/2	5/8 & 3/4	6 5/8	11/32	.39	.52	1729
1130	3/8	1/2			11/16 & 7/8	7 5/8	13/32	.42	.56	1130
1730			7/16	9/16	5/8 & 13/16	7 5/8	13/32	.42	.56	1730
1131	7/16	1/2			25/32 & 7/8	7 5/8	13/32	.45	.60	1131
1731			1/2	9/16	3/4 & 13/16	7 5/8	13/32	.45	.60	1731
1731A			1/2	5/8	3/4 & 7/8	7 5/8	13/32	.45	.60	1731A
1731B			9/16	5/8	13/16 & 7/8	7 5/8	13/32	.45	.60	1731B
1132	7/16	9/16			25/32 & 31/32	8 1/2	7/16	.48	.64	1132
1732			9/16	3/4	13/16 & 1	8 1/2	7/16	.48	.64	1732
1133	1/2	9/16			7/8 & 31/32	8 1/2	7/16	.54	.72	1133
1733			5/8	3/4	7/8 & 1	8 1/2	7/16	.54	.72	1733
1134	1/2	5/8			7/8 & 1 1/16	9 7/16	1/2	.60	.80	1134
1734			5/8	7/8	7/8 & 1 1/8	9 7/16	1/2	.60	.80	1734
1135	9/16	5/8			31/32 & 1 1/16	9 7/16	1/2	.66	.88	1135
1735			3/4	7/8	1 & 1 1/8	9 7/16	1/2	.66	.88	1735
1136	9/16	3/4			31/32 & 1 1/4	11 5/16	9/16	.77	1.02	1136
1736			3/4	1	1 & 1 1/4	11 5/16	9/16	.77	1.02	1736
1137	5/8	3/4			1 1/16 & 1 1/4	11 5/16	9/16	.87	1.16	1137
1737			7/8	1	1 1/8 & 1 1/4	11 5/16	9/16	.87	1.16	1737



SUPERIOR DROP-FORGED TOOLS

"Ratcho" Wrench Set No. 24

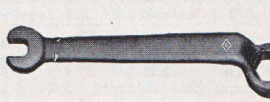
An "extra capacity" set of reliable drop-forged wrenches, milled with "Ratcho" openings for seven most important U. S. Standard Bolts and eight most important Cap Screw sizes.

There is nothing to get out of order in "Ratcho" Wrenches—no cogs, cams, nor mechanism—and in action they are materially more rapid than standard wrenches.

See page 57 for further details and other milled sizes.

Number	For Nuts Diam. Bolts: Small Head	For Nuts Diam. Bolts: Large Head	For Cap Scws. Diam. Scws.: Small Head	For Cap Scws. Diam. Scws.: Large Head	Openings, Milled: U. S. Standard	Extreme Length	Th'kness H'ds	PRICE: Semi-finished	PRICE: Finished	Number
1725		**1/4**	**1/4**	**5/16**	7/16 & 1/2	4 3/4	9/32	$.27	$.36	**1725**
1127C		**3/8**	**3/8**		9/16 & 11/16	5 3/4	5/16	.33	.44	**1127C**
1128	**5/16**	**7/16**			19/32 & 25/32	6 5/8	11/32	.36	.48	**1128**
1729			**7/16**	**1/2**	5/8 & 3/4	6 5/8	11/32	.39	.52	**1729**
1134	**1/2**	**5/8**	**5/8**		7/8 & 1 1/16	9 7/16	1/2	.60	.80	**1134**
1736		**3/4**	**3/4**	**1**	1 & 1 1/4	11 5/16	9/16	.77	1.02	**1736**
No. 24	**Set**		List Price of Roll, $.45 extra					$2.72	$3.62	**No. 24**

SPARK PLUG WRENCH No. 993



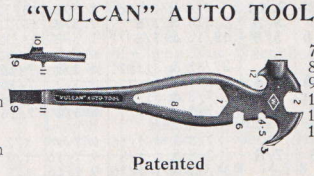
Drop-forged from steel and designed for convenient service about automobiles, motor boats, gas engines, etc. See Wrench Sets, pages 54 and 55.

Open End—
For Tire Lug
3/8" U. S. Standard Cap Screw
3/8" A. L. A. M. Standard Nut
3/8" A. L. A. M. Standard Cap Screw
9/16" Set Screw

Box End—
7/8" opening, for 1/2" **Spark Plug**
1/2" U. S. Standard Nut
List price, Unfinished.....$.40 each
List price, Semi-Finished..... .60 each
List price, Finished..... .80 each

"VULCAN" AUTO TOOL

1 Hammer
2 Tire Lug Wrench
3 Cotter Pin Puller
4 Gas Tank Wrench
5 Wire Insulation Scraper
6 Air Tank Wrench



7 Spark Plug Wrench
8 Alligator Wrench
9, 10, 11 Cotter Pin Spreader 3 Screw Drivers
12 Bottle Opener

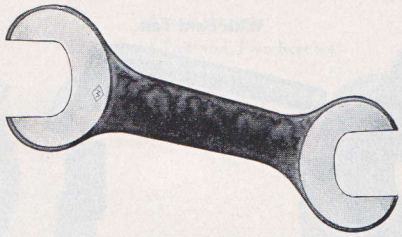
Patented

Weight, 1/2 lb. Length, 8 inches

These tools are drop-forged, accurately machined and tempered. Every feature is an efficient aid to man or mechanician. Packed in Canvas Carriers for the pocket and sold in not less than dozen lots. List price, Blued or Nickel-plated, $12.00 per dozen.

"SHORT" WRENCH

15° Angle, Double Head



For Check Nuts and Miscellaneous Uses

Number	For U. S. Standard Nuts; Size Bolts	Openings, Milled	Extreme Length	Thickness Heads	PRICE Unfinished	PRICE Semi-finished	PRICE Finished	Number
997	**3/4 & 7/8**	1 1/4 & 1 7/16	8	1/2 & 1/2	$.43	$.65	$.86	**997**



TELEGRAPH LINEMAN'S WRENCH

For Lag Screws, Rough Nuts, Etc.

Especially designed for dependable service in the erection of cross-arms on telegraph, etc., poles, but equally adaptable for use about agricultural and other machinery.

Number	Forged Openings For	Extreme Length	Thickness Heads	PRICE Unfinished	Number
999	**3/8, 7/16, 1/2, 9/16, 3/4,** Lag Screws **5/16, 3/8, 7/16, 1/2, 9/16, 5/8,** Sq. Nuts **7/16, 1/2, 5/8,** Hex. Nuts	13 3/4	1/2 & 5/8	$2.00	**999**



FIRE HYDRANT WRENCH

For the pentagonal forms of Valve Stems, Outlet Covers and other shapes commonly found on screws and bolts of municipal fire hydrants, etc.

Number	Sizes Openings, Broached: Large Pent. on Side	Small Pent. on Side	Hexagon Across Flats	Square Across Flats	Extreme Length	Thickness Heads	PRICE Unfinished	Number
998	1 1/32	7/8	1 23/32	1 19/32	16 1/4	1/2	**$2.00**	**998**

"VULCAN"

DROP-FORGED SAFETY LATHE DOGS

With Bent Tail



Dog with Safety Screw





Dog with Square Head Screw

Safety-for-the-operator and better balance when on the lathe are material improvements which have been attained by modification of design.

The special steel Screws, threaded U. S. Standard, are hardened and tempered.

By drilling and tapping for the different diameters either style of screw may be used in same forging. Safety and Square Head Screws are not interchangeable. Please use numbers and state which Screw is desired. With orders for Safety Dogs a "Safety" Wrench will be supplied.

For convenience of dealers when shelving, sizes up to No. 8 inclusive will be packed two in a box.

Unless otherwise specified, Dogs with Square Head Screws will be supplied.

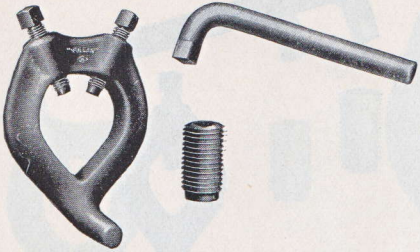
Number	Capacity	SCREWS						PRICE		Number
		Square Head			Safety			Safety Dog Wrench, extra	Dog with either Screw	
		Size		Price, each	Size		Price, each			
		Diam.	Length		Diam.	Length				
1	**3/8**	5/16	1 1/4	$.08	7/16	5/8	$.10	$.06	$.40	**1**
2	**1/2**	3/8	1 1/4	.10	9/16	13/16	.14	.07	.50	**2**
3	**3/4**	7/16	1 5/8	.12	5/8	1 1/16	.18	.08	.60	**3**
4	**1**	1/2	2	.15	11 16	1 1/4	.22	.09	.70	**4**
5	**1 1/4**	1/2	2 1/4	.16	3/4	1 3/8	.26	.10	.85	**5**
6	**1 1/2**	9/16	2 3/8	.18	13/16	1 5/8	.32	.11	1.00	**6**
7	**1 3/4**	5/8	2 1/2	.20	7/8	1 3/4	.40	.13	1.20	**7**
8	**2**	11/16	2 3/4	.23	1	1 7/8	.50	.15	1.40	**8**
9	**2 1/2**	11/16	3	.24	1 1/8	2	.60	.18	1.70	**9**
10	**3**	3/4	3 1/4	.27	1 1/4	2 1/8	.70	.22	2.10	**10**
11	**3 1/2**	7/8	3 1/2	.32	1 3/8	2 1/2	.80	.27	2.60	**11**
12	**4**	7/8	3 3/4	.35	1 1/2	2 5/8	.90	.33	3.30	**12**
13	**5**	1	4 1/2	.50	1 5/8	3 1/8	1.00	.40	6.00	**13**

"VULCAN"

DROP-FORGED SAFETY LATHE DOGS

Extra Heavy

With Bent Tail and Two Screws



Dog with Square Head Screws



Dog with Safety Screws

Safety-for-the-operator and better balance when on the lathe are material improvements which have been attained by modification of design.

The special steel Screws, threaded U. S. Standard, are hardened and tempered.

By drilling and tapping for the different diameters either style of screw may be used in same forging. Safety and Square Head Screws are not interchangeable. Please use numbers and state which Screw is desired. With orders for Safety Dogs a "Safety" Wrench will be supplied.

Unless otherwise specified, Dogs with Square Head Screws will be supplied.

Number	Capacity	SCREWS						PRICE		Number
		Square Head			Safety					
		Size		Price, each	Size		Price, each	Safety Dog Wrench, extra	Dog with either Screw	
		Diam.	Length		Diam.	Length				
12A	**4**	7/8	3 3/4	$.35	1 1/2	2 5/8	$.90	$.33	5.00	**12A**
13A	**5**	1	4 1/2	.50	1 5/8	3 1/8	1.00	.40	9.00	**13A**
14A	**6**	1	4 1/2	.50	1 3/4	3 1/2	1.15	.48	14.00	**14A**

"VULCAN"

DROP-FORGED SAFETY LATHE DOGS

With Straight Tail



Dog with Safety Screw



Dog with Square Head Screw

Safety-for-the-operator and better balance when on the lathe are material improvements which have been attained by modification of design.

The special steel Screws, threaded U. S. Standard, are hardened and tempered.

By drilling and tapping for the different diameters either style of Screw may be used in same forging. Safety and Square Head Screws are not interchangeable. Please use numbers and state which Screw is desired. With orders for Safety Dogs a "Safety" Wrench will be supplied.

For convenience of dealers when shelving, sizes up to No. 28 inclusive will be packed two in a box.

Unless otherwise specified, Dogs with Square Head Screws will be supplied.

Number	Capacity	SCREWS						PRICE		Number
		Square Head			Safety			Safety Dog Wrench, extra	Dog with either Screw	
		Size		Price, each	Size		Price, each			
		Diam.	Length		Diam.	Length				
21	**3/8**	5/16	1 1/4	$.08	7/16	5/8	$.10	$.06	$.40	**21**
22	**1/2**	3/8	1 1/4	.10	9/16	13/16	.14	.07	.50	**22**
23	**3/4**	7/16	1 5/8	.12	5/8	1 1/16	.18	.08	.60	**23**
24	**1**	1/2	2	.15	11/16	1 1/4	.22	.09	.70	**24**
25	**1 1/4**	1/2	2 1/4	.16	3/4	1 3/8	.26	.10	.85	**25**
26	**1 1/2**	9/16	2 3/8	.18	13/16	1 5/8	.32	.11	1.00	**26**
27	**1 3/4**	5/8	2 1/2	.20	7/8	1 3/4	.40	.13	1.20	**27**
28	**2**	11/16	2 3/4	.23	1	1 7/8	.50	.15	1.40	**28**
29	**2 1/2**	11/16	3	.24	1 1/8	2	.60	.18	1.70	**29**
30	**3**	3/4	3 1/4	.27	1 1/4	2 1/8	.70	.22	2.10	**30**
31	**3 1/2**	7/8	3 1/2	.32	1 3/8	2 1/2	.80	.27	2.60	**31**
32	**4**	7/8	3 3/4	.35	1 1/2	2 5/8	.90	.33	3.30	**32**
33	**5**	1	4 1/2	.50	1 5/8	3 1/8	1.00	.40	6.00	**33**

"VULCAN"

DROP-FORGED SAFETY LATHE DOGS

Extra Heavy

With Straight Tail and Two Screws



Dog with Square Head Screws



Dog with Safety Screws

Safety-for-the-operator and better balance when on the lathe are material improvements which have been attained by modification of design.

The special steel Screws, threaded U. S. Standard, are hardened and tempered.

By drilling and tapping for the different diameters either style of screw may be used in same forging. Safety and Square Head Screws are not interchangeable. Please use numbers and state which Screw is desired. With orders for Safety Dogs a "Safety" Wrench will be supplied.

Unless otherwise specified, Dogs with Square Head Screws will be supplied.

Number	Capacity	SCREWS						PRICE		Number
		Square Head			Safety			Safety Dog Wrench, extra	Dog with either Screw	
		Size		Price, each	Size		Price, each			
		Diam.	Length		Diam.	Length				
32A	**4**	7/8	3 3/4	$.35	1 1/2	2 5/8	$.90	$.33	$5.00	**32A**
33A	**5**	1	4 1/2	.50	1 5/8	3 1/8	1.00	.40	9.00	**33A**
34A	**6**	1	4 1/2	.50	1 3/4	3 1/2	1.15	.48	14.00	**34A**

"VULCAN"
DROP-FORGED MILLING MACHINE DOGS

With Flat, Bent Tail



These are designed for taper work carried between centers on milling machines; the flat tail works in the head-slot without the back-lash unavoidable in dogs with taper tail. They serve also as a heavy pattern Lathe Dog.

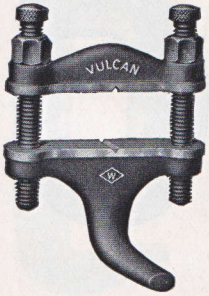
The heads are made of sufficient size to permit re-tapping for one or two larger sizes of screws as the threads wear.

The screws, threaded U. S. Standard, are made of a special grade of steel well adapted to the purpose and are hardened and tempered.

Number	Capacity	Screw		PRICE		Number
		Diameter	Length	Extra Screws, each	Dogs, Complete	
42	**1/2**	3/8	1 1/4	$.10	$.50	**42**
43	**3/4**	7/16	1 5/8	.12	.60	**43**
44	**1**	1/2	2	.15	.70	**44**
45	**1 1/4**	1/2	2 1/4	.16	.85	**45**
46	**1 1/2**	9/16	2 3/8	.18	1.00	**46**
47	**1 3/4**	5/8	2 1/2	.20	1.20	**47**
48	**2**	11/16	2 3/4	.23	1.40	**48**

"VULCAN"

DROP-FORGED CLAMP LATHE DOGS



These are drop-forged from a strong, tough grade of carefully selected steel and are submitted to a special process after forging which increases their stiffness and strength and reduces the liability of springing.

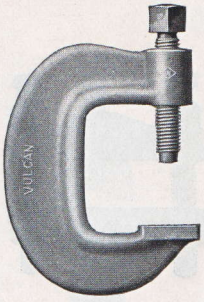
The screws, threaded U. S. Standard, are made of a special grade of steel, well adapted to the purpose and are hardened and tempered. The Nuts are case hardened. Extra Screws and Nuts carried in stock.

The Nuts furnish ready means of arrangement for the minimum projection of Screws beyond the body of Dog and thus lessen the danger to the operator when tool is in use.

Packed two in a box for convenient shelving.

Number	Distance between Screws	Maximum Opening	Screws		PRICE, Dog	Number
			Diameter	Length		
61	**1 3/4**	**1 5/8**	5/16	2 3/4	$1.50	**61**
62	**2 1/4**	**1 7/8**	3/8	3 5/16	2.00	**62**
63	**2 3/4**	**2 1/2**	7/16	4 9/32	2.50	**63**
64	**3 1/2**	**3 1/4**	1/2	5 1/8	3.50	**64**

"VULCAN"
DROP-FORGED "C" CLAMPS
For Extreme Service



These are drop-forged from a strong, tough grade of carefully selected steel and their form is such as to utilize the metal to the greatest advantage.

They are submitted to a special process after forging which increases their stiffness and strength and reduces the liability of springing.

The screws, threaded U. S. Standard, are made of a special grade of steel well adapted to the purpose and are hardened and tempered.

For convenience of dealers, each Clamp is packed in a box.

*Number	Old Number	Capacity	Depth of Throat from center of Screw	Extreme Dimensions of Body		Screw		Approx Wght Each, Lbs.	PRICE	
				Length	Width	Diam.	L'gth		Extra Screws, each	Clamps, complete
0	9	**3/4**	3/4	2 3/16	1 15/16	5/16	1 1/4	1/4	$.08	$.50
1	10	**1 1/4**	1 1/8	3 1/4	2 3/4	3/8	1 3/4	5/8	.11	.75
1 1/2	11	**1 3/4**	1 1/2	4 1/4	3 5/8	1/2	2 1/4	1 7/8	.14	1.25
2	12	**2 1/4**	1 3/4	5 1/2	4 1/2	5/8	2 7/8	3 3/4	.20	1.75
3	13	**3 1/4**	2 3/8	7 1/4	5 3/4	3/4	3 3/4	6	.28	2.50
4	14	**4 1/2**	2 3/4	8 7/8	6 1/2	7/8	4 1/2	10 1/4	.38	3.25
5	15	**5 1/2**	3 1/8	10 3/8	7	7/8	5 3/8	12 1/4	.50	4.00
6	16	**6 1/2**	3 3/8	12	7 7/8	1	5 7/8	17	.65	5.00
8	18	**8 1/2**	3 3/4	14 3/8	8 1/2	1 1/8	7	23 1/4	.85	7.00
10 1/2		**10 1/2**	4 1/8	16 7/8	9 1/16	1 1/8	7	28	.85	9.50
12 1/2		**12 1/2**	4 1/2	19 3/8	9 3/4	1 1/4	8	40	1.20	12.50

*New Numbers, approximating the capacities of Clamps, have been applied to this line. Specifications for old numbers will be filled without confusion.

"AGRIPPA"
DROP-FORGED "C" CLAMPS
For Less Severe Service



Drop-forged from a strong, tough grade of carefully selected steel, these light clamps are designed to afford the service formerly rendered by the heavier and bulkier steel clamps of other processes of manufacture, this form and method of production utilizing the metal to the greatest advantage. They are also submitted to a special process after forging which further increases their stiffness and strength and reduces the liability of springing.

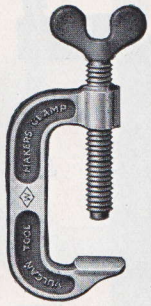
The minimum capacity of "Agrippa" Clamps is approximately the maximum of the second smaller size tool.

The screws, threaded U. S. Standard, are made of a special grade of steel, well adapted to the purpose and are hardened and tempered.

For convenience of dealers, each Clamp is packed in a box.

Number	Capacity	Depth of Throat from Center of Screw	Extreme Dimensions of Body		Screw		Size Handle		Approx. Weight Each, Lbs.	PRICE		Number
			Length	Width	Diam.	Length with Swivel	Diam.	Length		Extra Screws, each	Clamps	
104	**4**	2 3/8	8 3/16	5 1/8	3/4	6	3/8	7	5 1/4	$.70	$2 25	**104**
106	**6**	2 1/2	10 5/16	5 3/8	3/4	6	3/8	7	6 1/4	.70	2.75	**106**
108	**8**	2 5/8	12 7/16	5 9/16	3/4	6	3/8	7	7 1/2	.70	3 25	**108**
110	**10**	2 3/4	14 5/8	5 13/16	3/4	6	3/8	7	9	.70	3.75	**110**
112	**12**	2 7/8	16 13/16	6 1/16	3/4	6	3/8	7	10 1/2	.70	4.25	**112**
115	**15**	3 1/16	20 1/4	6 9/16	7/8	8 1/8	7/16	8	15	.90	5.50	**115**
118	**18**	3 1/4	23 1/2	7	7/8	8 1/8	7/16	8	20	.90	7.00	**118**

"VULCAN"
DROP-FORGED TOOL MAKERS' "C" CLAMPS
For Light Service



A development of our own practices and designed to meet the tool makers requirements for a trustworthy, lighter service tool.

They are drop-forged from a strong, tough grade of steel and submitted to a special process after forging which assures increased strength and stiffness and reduces liability of springing.

The screws, threaded U. S. Standard, are drop-forged from a special grade of steel and are hardened and tempered.

In stock in two conditions:

Black, are oil treated only.

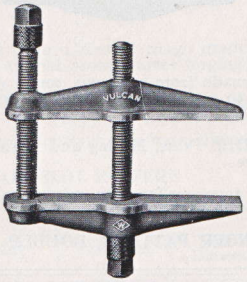
Bright, surfaces and edges of clamp all ground, panel black—see illustration.

Unless otherwise specified, "black" will be furnished.

Packed singly in boxes, or in sets if specified.

Number	Capacity	Depth of Throat	Extreme Dimensions Clamp		Screw		PRICE			Number
			Length	Width	Diam.	Length	Screw	Clamp Black	Clamp Bright	
201	**1**	11/16	2 1/8	1 1/2	5/16	1 21/32	$.15	$.50	$.75	**201**
202	**2**	13/16	3 5/16	1 7/8	3/8	2 7/16	.20	.65	.95	**202**
203	**3**	15/16	4 1/2	2 1/8	3/8	3 3/16	.25	.85	1.25	**203**
Per Set								$2.00	$2.95	**Per Set**

"VULCAN"
DROP-FORGED MACHINISTS' CLAMPS



These clamps are drop-forged from a strong, tough grade of carefully selected steel and are submitted to a special process which increases their strength and reduces the liability of springing.

The knurled portion of the hardened and tempered Screws permits rapid and easy adjustment.

When ordering extra Screws specify whether for end or center.

Each Clamp is packed in a box for convenient shelving.

Number	Capacity		Screws				PRICE	Number
	Maximum Opening	Length Jaw from Screw	End		Center		Complete Clamp	
			Length	Diam.	Length	Diam.		
301	1 1/4	1 3/4	2	5/16	2 5/8	5/16	$1.50	**301**
302	2 1/4	2 1/4	3 1/8	3/8	3 15/16	3/8	2.00	**302**
303	3 1/4	2 3/4	4 7/16	7/16	5 1/4	7/16	2.50	**303**
304	4 1/4	3 1/4	5 1/2	1/2	6 1/2	1/2	3.00	**304**

"VULCAN"
DROP-FORGED STRAP CLAMPS



These forgings are made from a strong, tough grade of carefully selected steel and are submitted to a special process after forging which increases their strength and stiffness.

On Planer, Lathe, Drill Press, Milling and Boring Machine work they are time-saving and effective.

Because of draft or taper on forgings, minimum dimensions of opening are given in table.

FINGER PATTERN, DOUBLE END

Number	Old Number	Length	Width Center	Thickness Center	Diameter Hole	Finger Dimensions	PRICE	Number
30	330	**3**	1 1/2	5/8	11/16	1/2 & 1/2	$.20	**30**
35	335	**3 1/2**	1 5/8	3/4	11/16	5/8 & 5/8	.25	**35**
40	340	**4**	1 13/16	7/8	13/16	3/4 & 3/4	.35	**40**



FINGER PATTERN, SINGLE END

Number	Old Number	Length	Width		Thickness		Slot Min. Dimensions		Finger Dimensions	PRICE
			Flat End	Center	Flat End	Center	Length	Width		
44		**4**	1 3/16	1 3/8	7/16	3/4	1 3/8	11/16	1/2 & 1/2	$.30
46	306	**6**	1 1/4	1 3/4	1/2	7/8	1 15/16	11/16	5/8 & 5/8	.50
48	308	**8**	1 1/2	2 1/8	5/8	1 1/8	2 9/16	13/16	3/4 & 3/4	.85

"VULCAN"
DROP-FORGED STRAP CLAMPS



These forgings are made from a strong, tough grade of carefully selected steel and are submitted to a special process after forging which increases their strength and stiffness.

On Planer, Lathe, Drill Press, Milling and Boring Machine work they are time-saving and effective.

Because of draft or taper on forgings, minimum dimensions of slot are given in table.

PLAIN SLOT PATTERN

Number	Old Number	Length	Width		Thickness		Slot Min. Dimensions		PRICE	Number
			Ends	Center	Ends	Center	Length	Width		
54	4	**4**	1 3/16	1 5/8	1/2	3/4	1 3/8	11/16	$.30	**54**
56	6	**6**	1 1/4	1 3/4	9/16	7/8	2 1/16	11/16	.50	**56**
58	8	**8**	1 1/2	2 1/8	3/4	1 1/8	2 13/16	13/16	.85	**58**



ADJUSTABLE STEP PATTERN

Number	Old Number	Length	Width		Thickness		Slot Minimum Dimensions	Screws		PRICE		Number
			Ends	Center	Ends	Center		Diam.	Length	Extra Screws, each	Clamps, each	
54A	4A	**4**	1 3/16	1 5/8	1/2	3/4	11/16 by 1 3/8	1/2	1 3/4	$.14	$.45	**54A**
56A	6A	**6**	1 1/4	1 3/4	9/16	7/8	11/16 by 2 1/16	5/8	2 1/8	.18	.72	**56A**
58A	8A	**8**	1 1/2	2 1/8	3/4	1 1/8	13/16 by 2 13/16	3/4	2 1/2	.25	1.20	**58A**

For other designs see page 72

"VULCAN"
DROP-FORGED STRAP CLAMPS



These forgings are made from a strong, tough grade of carefully selected steel and are submitted to a special process after forging, which increases their strength and stiffness.

On Planer, Lathe, Drill Press, Milling and Boring Machine work they are time-saving and effective.

Because of draft or taper on forgings, minimum dimensions of slot are given in table.

"U" PATTERN

Number	Old Number	Length	Maximum Width	Thickness	Slot Dimensions		Finger Dimensions	PRICE	Number
					Min. Width	Max. Length			
64	104	**4 1/2**	1 3/4	3/4	11/16	3 1/2	1/2 x 1/2	$.30	**64**
66	106	**6 5/8**	1 15/16	7/8	11/16	5 1/2	5/8 x 5/8	.50	**66**
68		**8 3/4**	2 13/32	1 1/8	13/16	7 3/8	3/4 x 3/4	.85	**68**



GOOSE NECK PATTERN

Number	Old Number	Length	Width		Thickness		Slot Min. Dimensions		Neck offset	PRICE
			Ends	Center	Ends	Center	Length	Width		
74	204	**4**	1 3/16	1 3/8	1/2 & 3/8	3/4	15/16	11/16	13/16	$.30
76	206	**6**	1 1/4	1 3/4	7/16 & 9/16	7/8	1 11/16	11/16	15/16	.50
78	208	**8**	1 1/2	2 1/8	9/16 & 3/4	1 1/8	2 7/16	13/16	1 1/8	.85

"VULCAN"
EXTERNAL CALIPER GAUGES

Double End—Unfinished



These are drop-forged from mild steel, suitable for case-hardening, but they can also be furnished to order in reasonable quantities from a grade of steel which will harden. We will supply directions for hardening, or case-harden to order, but cannot undertake machining.

The lettering-panels and sides of jaws are on same plane and may be finished by a single grinding or polishing operation.

The special size of the measuring-jaw or pad provides for unusual advantages; five classes of gauges may be made from one forging:

1. Plain gauge; same dimension both ends.
2. Gauge with one end of exact dimension, other end for two limits allowed.
3. Gauge with any two dimensions within range of table limits.
4. Gauge of the "go on" and "not go on" variety; two combinations.
5. Plain gauge; four dimensions.

Furnished Unfinished only, packed half-dozen in a box.

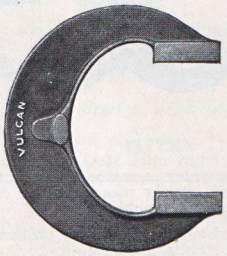
Number	Capacity	Extreme Dimensions		Dimensions of Measuring Pad		PRICE Unfinished	Number
		Length	Width	Length	Width		
2	**1/4 to 3/8**	2 1/8	15/16	15/32	3/16	$.20	**2**
4	**3/8 to 1/2**	2 1/2	1 1/8	1/2	3/16	.22	**4**
6	**1/2 to 3/4**	3 1/8	1 9/16	19/32	1/4	.25	**6**
8	**3/4 to 1**	3 5/8	1 15/16	21/32	9/32	.30	**8**
10	**1 to 1 1/4**	4 3/8	2 3/8	3/4	9/32	.39	**10**
12	**1 1/4 to 1 1/2**	5	2 3/4	27/32	5/16	.53	**12**
14	**1 1/2 to 1 3/4**	5 9/16	3 1/16	15/16	5/16	.72	**14**
16	**1 3/4 to 2**	6 5/16	3 1/2	1	5/16	.96	**16**
18	**2 to 2 1/2**	7 1/4	4 5/16	1 5/32	15/32	1.25	**18**
20	**2 1/2 to 3**	8 9/16	5 1/8	1 11/32	1/2	1.60	**20**

"VULCAN"

EXTERNAL CALIPER GAUGES

Single End

Unfinished



These are drop-forged from mild steel, suitable for case-hardening, but they can also be furnished to order in reasonable quantities from a grade of steel which will harden. We will supply directions for hardening, or case-harden to order, but cannot undertake machining.

They possess the same general characteristics as the Double End form on preceding page.

Three classes of gauges may be made from one forging:

1. Plain gauge; single dimension.
2. Gauge with any two dimensions within range of table limits.
3. Gauge of the "go on" and "not go on" variety; one combination.

Furnished Unfinished only, packed half-dozen in a box.

Number	Capacity	Extreme Dimensions		Dimensions of Measuring Pad		PRICE Unfinished	Number
		Length	Width	Length	Width		
22	**3 to 3 1/2**	5 1/8	5 3/4	1 1/2	1/2	$1.00	**22**
24	**3 1/2 to 4**	5 11/16	6 1/2	1 11/16	17/32	1.20	**24**
26	**4 to 4 1/2**	6 1/4	7 3/16	1 13/16	17/32	1.45	**26**
28	**4 1/2 to 5**	6 25/32	7 25/32	2	9/16	1.75	**28**
30	**5 to 5 1/2**	7 7/16	8 19/32	2 1/8	9/16	2 10	**30**
32	**5 1/2 to 6**	7 15/16	9 3/16	2 9/32	9/16	2.50	**32**

"VULCAN"

INTERNAL CALIPER GAUGES

Double End

Unfinished



These are drop-forged from mild steel, suitable for case-hardening, but they can also be furnished to order in reasonable quantities from a grade of steel which will harden. We will supply directions for hardening, or case-harden to order, but cannot undertake machining.

The lettering-panels and sides of jaws are on same plane and may be finished by a single grinding or polishing operation.

Small bosses at ends of Internal Gauges provide ready means of centering for lathe turning.

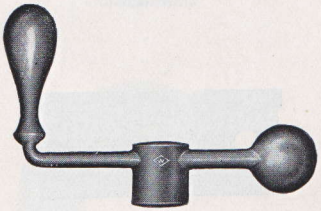
The special size of the measuring-jaw or pad provides for unusual advantages; four classes of gauges may be made from one forging:

1. Plain gauge; same dimension both ends.
2. Gauge with one end of exact dimension, other end for two limits allowed.
3. Gauge with any two dimensions within range of table limits.
4. Gauge of the "go in" and "not go in" variety; two combinations.

Furnished Unfinished only, packed half-dozen in box.

Number	Capacity	Extreme Dimensions		Dimensions of Measuring Pad		Length Center Pad	PRICE Unfinished	Number
		Length	Width	Length	Width			
110	**1 to 1 1/4**	3	1 11/32	1	9/32	5/8	$.39	**110**
112	**1 1/4 to 1 1/2**	3 1/2	1 5/8	1 1/4	5/16	5/8	.53	**112**
114	**1 1/2 to 1 3/4**	4 1/4	1 27/32	1 1/2	5/16	3/4	.72	**114**
116	**1 3/4 to 2**	4 7/8	2 1/8	1 3/4	5/16	13/16	.96	**116**
118	**2 to 2 1/2**	5 3/8	2 19/32	1 15/16	15/32	7/8	1.25	**118**
120	**2 1/2 to 3**	6 3/8	3 1/8	2 5/16	1/2	1	1.60	**120**

"VULCAN"
DROP-FORGED BALANCE HANDLES



Unfinished are plain forgings without any hole in hub.

Broached have holes finished but are otherwise plain forgings.

Finished are broached, ground, polished, case-hardened all over and lacquered to prevent rusting.

The broached openings are made with corners slightly rounded to prevent breakage.

Holes are regularly finished to standard sizes given below, but each forging admits of broaching to the maximum dimensions stated in table. Smaller openings than standard and special sizes can be broached to order. Handles can also be supplied with round holes in hub; details on application.

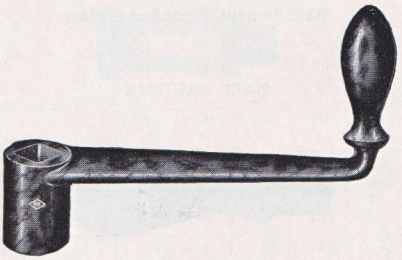
Diameter Ball:

No. 512 1¼ inches. No. 520 1¼ inches. No. 525 1 7/16 inches.
No. 516 1¼ inches. No. 522 1⅜ inches. No. 529 1½ inches.

Number	Length			Hub		Square Hole Size Broached		PRICE			Number
	C Hub to C Handle	Extreme	Handle above Arm	Length	Diam	Standard in Stock	Maximum to Order	Unfinished	Broached	Finished	
512	**1 1/4**	3 5/16	1 15/16	3/4	7/8	7/16	1/2	$.45	$.75	$1.30	**512**
516	**1 5/8**	4	2 1/4	7/8	7/8	7/16	1/2	.50	.80	1.40	**516**
***520**	**2**	5	2 5/8	15/16	1	1/2	5/8	.55	.85	1.50	***520**
522	**2 1/4**	5 1/2	2 3/4	1	1	1/2	13/16	.60	.90	1.65	**522**
***525**	**2 1/2**	6	2 13/16	1 1/8	1 1/4	5/8	13/16	.70	1.05	1.85	***525**
529	**2 7/8**	7	3 5/16	1 1/4	1 1/4	5/8	13/16	.85	1.20	2.10	**529**

*Handle Cone-shaped, see Crank Handle Cut, page 77

"VULCAN"
DROP-FORGED CRANK HANDLES

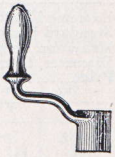


Unfinished are plain forgings without hole in hub.

Broached have holes finished and hubs recessed or counterbored in free end but are otherwise plain forgings.

Finished are broached, counterbored, ground, polished, case-hardened all over and lacquered to prevent rusting.

The broached openings are made with corners slightly rounded to prevent breakage.



Holes are regularly finished to standard sizes given below, but each forging admits of broaching to the maximum dimensions stated in table. Smaller openings than standard and special sizes, running by sixteenths from ½ to 1 inch inclusive and thence by eighths, can be broached to order.

Hubs of Broached or Finished can be cut to shorter lengths and Handles will be offset (see cut) if desired, at an additional charge.

Number	Length			Hub		Square Hole Size Broached		PRICE			Number
	Center to Center	Extreme	Handle above Arm	Length	Diam.	Standard in Stock	Maximum to Order	Unfinished	Br'ched	Finished	
00	**1 3/4**	2 1/8	2 5/16	1 1/4	1	1/2	5/8	$.40	$.70	$1.05	**00**
0	**2 1/4**	3 1/8	2 1/2	1 1/4	1	1/2	5/8	.45	.75	1.15	**0**
1	**3**	4	2 3/4	1 1/2	1 1/4	9/16	13/16	.50	.80	1.30	**1**
2	**3 1/2**	4 1/2	2 7/8	1 5/16	1	1/2	5/8	.50	.80	1.30	**2**
4	**4**	5 1/8	3 1/8	1 5/16	1 1/4	9/16	13/16	.60	.90	1.50	**4**
6	**5**	6 1/8	3 3/16	1 13/16	1 1/4	5/8	13/16	.75	1.10	1.80	**6**
8	**6**	7 1/8	3 1/4	1 15/16	1 1/4	11/16	13/16	.95	1.35	2.20	**8**
10	**7**	8 1/4	3 7/16	2	1 3/8	3/4	7/8	1.20	1.65	2.70	**10**
12	**8**	9 3/8	3 5/8	2 7/16	1 1/2	7/8	1	1.50	2.05	3.30	**12**
14	**9 1/8**	10 1/2	3 5/8	2 1/2	1 1/2	7/8	1	1.70	2.25	3.70	**14**
16	**10**	11 1/2	4	3	1 3/4	1	1 1/8	2.25	2.95	4.65	**16**

"VULCAN"

MACHINE HANDLE FORGINGS

Unfinished

With Smooth, Planished Surface

BALL PATTERN



Number	00	0	1	2	3	4	5	6	7
Extreme Length	2	2 1/4	2 5/8	3 1/4	3 7/8	4 1/2	5 1/8	5 3/4	6 5/8
Standard Length, Shank	1/2	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2
Maximum Length, Shank	11/16	3/4	1	1 1/8	1 1/4	1 1/2	1 7/8	2	2 1/8
Diameter, Shank	5/16	11/32	13/32	15/32	15/32	17/32	19/32	11/16	3/4
Price	$.07	$.08	$.10	$.13	$.17	$.22	$.27	$.33	$.40

CONE PATTERN



Number	11	13	15	16
Extreme Length	3 1/2	4 1/2	5 1/2	6
Standard Length, Shank	1/2	3/4	7/8	1 1/8
Maximum Length, Shank	11/16	1 1/8	1 3/8	1 1/2
Diameter, Shank	3/8	7/16	1/2	9/16
Price	$.13	$.22	$.27	$.33

"VULCAN"
TOOL POST FITTINGS
Unfinished

TOOL POSTS



Openings Punched Out

Number	5	10	20	30	40	50	60
Old Number	..	0	2	3	4	5	7
Extreme length	$2\frac{15}{16}$	$4\frac{1}{16}$	$4\frac{9}{16}$	$5\frac{1}{4}$	$6\frac{5}{16}$	$7\frac{3}{8}$	$8\frac{3}{4}$
Diameter of Body	$1\frac{1}{32}$	$1\frac{1}{4}$	$1\frac{5}{8}$	$1\frac{13}{16}$	$2\frac{1}{16}$	$2\frac{1}{4}$	$2\frac{31}{32}$
Length of Body	2	$2\frac{7}{8}$	$3\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{3}{8}$	5	6
Diameter of Base	$1\frac{7}{32}$	$1\frac{5}{8}$	$2\frac{1}{8}$	$2\frac{5}{16}$	$2\frac{5}{8}$	$2\frac{15}{16}$	$3\frac{5}{8}$
Thickness of Base	$\frac{9}{16}$	$\frac{1}{2}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{5}{8}$	$\frac{3}{4}$
Distance Base to Opening	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{13}{16}$	$\frac{15}{16}$	$1\frac{3}{16}$	$1\frac{3}{8}$	$1\frac{1}{2}$
Size of Opening	$1\frac{5}{16}$x$\frac{7}{16}$	$1\frac{15}{16}$x$\frac{19}{32}$	$1\frac{7}{8}$x$\frac{11}{16}$	$2\frac{1}{8}$x$\frac{3}{4}$	$2\frac{1}{2}$x$\frac{7}{8}$	$2\frac{7}{8}$x$\frac{15}{16}$	$3\frac{9}{16}$x1
For Use with Wedge	5	10	11 &1 5	20	30& 40	60	..
For Use with Ring	5	10	11	20	30& 40	60	..
Price	$.20	$.30	$.45	$.60	$.80	$1.00	$2.00

TOOL POST WEDGES



For Changing Angles of Lathe Tools

Several sets of Dies are available for other similar Wedges. Blue prints and prices on application.

Number	5	10	11	15	20	30	40	60
Old Number	..	0	1	$1\frac{1}{2}$	2	3	4	6
Length	$2\frac{13}{32}$	3	$3\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{7}{8}$	$4\frac{3}{8}$	$4\frac{7}{8}$	$5\frac{1}{4}$
Width	$\frac{15}{32}$	$\frac{9}{16}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{11}{16}$	$\frac{3}{4}$	$\frac{13}{16}$	$\frac{15}{16}$
Extreme thickness	$\frac{11}{32}$	$\frac{31}{64}$	$\frac{25}{64}$	$\frac{7}{16}$	$\frac{17}{32}$	$\frac{1}{2}$	$\frac{21}{32}$	$\frac{3}{4}$
Radius	3	$2\frac{7}{8}$	$4\frac{3}{8}$	$4\frac{3}{8}$	$4\frac{3}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6
For Use with Post	5	10&20	20	20	30	40	40	50
For Use with Ring	5	10	11	11	20	30	40	60
Price	$.04	$.07	$.09	$.09	$.10	$.12	$.14	$.18

TOOL POST RINGS



For Changing Angles of Lathe Tools

Number	5	10	11	20	30	40	60
Old Number	..	0	1	2	3	4	6
Diameter, Outside	$2\frac{1}{4}$	$2\frac{15}{16}$	3	$3\frac{1}{2}$	$3\frac{1}{2}$	4	$4\frac{1}{2}$
Diameter, Hole	$1\frac{3}{16}$	$1\frac{5}{16}$	$1\frac{3}{8}$	$1\frac{3}{4}$	2	2	$2\frac{3}{16}$
Thickness, Outside Edge	$\frac{3}{8}$	$\frac{9}{16}$	$\frac{7}{16}$	$\frac{9}{16}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
Radius of Concave	3	$2\frac{7}{8}$	$4\frac{3}{8}$	$4\frac{3}{4}$	$5\frac{1}{2}$	$5\frac{3}{4}$	6
For Use with Post	5	10	20	30	40	40	50
For Use with Wedge	5	10	11& 15	20	30	40	60
Price	$.10	$.14	$.15	$.20	$.22	$.27	$.33

"VULCAN"
DROP-FORGED THUMB NUTS

Blank or Tapped



A



B

U. S. and Whitworth Standard threads in stock; other threads supplied to order.

These are drop-forged from steel and are furnished either Blank or Tapped.

Special sizes and shapes and Tobin Bronze Nuts to order.

Tapped Nuts have base faced at right angle to hole.

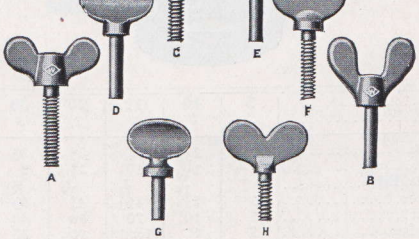
When ordering indicate pattern by letter; unless otherwise specified, Blanks will be sent. When ½-inch diameter V-Thread Nuts are required, specify with either 12 or 13 threads.

Price per 100, of either type

For Bolt, Size.....	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4
Diam. Top.....	1/4	5/16	3/8	7/16	17/32	5/8	21/32	3/4	13/16	15/16
U. S. Std. Threads.....	32	24	20	18	16	14	13 & 12	12	11	10
Price, Blank.....	$1.75	2.00	2.25	2.60	3.25	4.00	5.00	6.00	7.25	10.50
Price, Tapped.....	$3.50	4.00	4.50	5.20	6.50	8.00	10.00	12.00	14.50	21.00

"VULCAN"
DROP-FORGED THUMB SCREWS

Blank or Threaded



For Description and List, see opposite page

"VULCAN" THUMB SCREWS

Blank or Threaded

See cuts opposite page

Drop-forged from steel. Special sizes and shapes and Tobin Bronze Screws to order.

Type C can be furnished in the $\frac{5}{32}$ inch and $\frac{7}{32}$ inch diameters, up to 1 inch length.

Threaded Thumb Screws, except Types C and E, over 4 inches long have threads running up only 4 inches.

Type G is made in $\frac{1}{4}$, $\frac{5}{16}$, $\frac{3}{8}$ and $\frac{5}{8}$ inch diameters and Type H in $\frac{3}{8}$ inch diameter only, but in all regular lengths.

Dies for the following Screws have not yet been made, consequently these sizes are not now carried in stock.

$\frac{7}{16}$" diam. Type B.
$\frac{9}{16}$" diam. Type A, B, E and F.
$\frac{5}{8}$" diam. Type E and F.
$\frac{3}{4}$" diam. Type A, B, D, E and F.

When ordering indicate pattern by letter; unless otherwise specified Blanks will be sent.

When specifying Threaded Screws of $\frac{1}{2}$ inch diameter with V thread, please state whether 12 or 13 threads are wanted.

U. S., "V," and Whitworth Standard threading in stock; other threading to order.

Price of Blanks per 100, of any type
Threaded Screws double following list prices

Length under Head	Diameter and U. S. Standard Threads per inch										Length under Head
	1/8 32	3/16 24	1/4 20	5/16 18	3/8 16	7/16 14	1/2 13&12	9/16 12	5/8 11	3/4 10	
1/4	$1.60	$1.80	$2.05	$2.40	$2.95						1/4
1/2	1.70	1.90	2.15	2.50	3.05	$ 3.80	$ 4.75	$ 5.85			1/2
3/4	1.80	2.00	2.25	2.60	3.20	4.00	5.00	6.20			3/4
1	1.90	2.10	2.35	2.75	3.40	4.25	5.30	6.55	$8.00	$11.55	1
1 1/4	2.00	2.20	2.45	2.90	3.60	4.50	5.60	6.90	8.40	12.20	1 1/4
1 1/2	2.10	2.30	2.55	3.10	3.80	4.75	5.95	7.30	8.90	12.90	1 1/2
1 3/4		2.40	2.70	3.30	4.05	5.05	6.30	7.75	9.40	13.60	1 3/4
2		2.50	2.85	3.50	4.30	5.35	6.65	8.20	9.95	14.30	2
2 1/4			3.05	3.70	4.60	5.70	7.05	8.65	10.50	15.05	2 1/4
2 1/2			3.25	3.95	4.90	6.05	7.45	9.15	11.05	15.80	2 1/2
2 3/4			3.45	4.20	5.20	6.40	7.90	9.65	11.65	16.55	2 3/4
3			3.70	4.45	5.50	6.75	8.35	10.15	12.25	17.35	3
3 1/2				5.00	6.15	7.55	9.25	11.25	13.50	19.05	3 1/2
4				5.60	6.90	8.45	10.25	12.40	14.85	20.75	4
4 1/2					7.70	9.35	11.35	13.70	16.35	22.60	4 1/2
5					8.50	10.35	12.60	15.15	18.00	24.80	5
5 1/2					9.40	11.45	13.90	16.65	19.80	27.15	5 1/2
6							15.20	18.30	21.80	30.00	6

"VULCAN"

WELDLESS EYE BOLTS

Plain Pattern

Blank or Threaded



These Eye Bolts are submitted to a special refining process, or "heat treatment," after forging, which increases their strength and toughness and reduces the liability of breakage.

To insure proper service at listed capacity, every Eye Bolt, after heat treatment and before threading, is proof-tested to **fifty per cent. beyond** its rated "Safe Working Load."

Each Eye Bolt so tested is stamped **O** near its piece number which appears in raised letters on the forging and hence can be readily identified as **"proof-tested."**

U. S. Standard Threaded Eye Bolts of standard length are in stock; prices for these are for either U. S. or Whitworth Standard Threads; special threads extra.

Tobin Bronze Eye Bolts for marine work from standard or special dies to order in quantities; prices on application.

Prices given for Special Eye Bolts on receipt of drawings or models and specifications.

When ordering please state whether Blank or Threaded are desired; if not specified, Blank (shank not threaded) will be sent.

Number	Shank		Diameter Eye		Capacity, Net Tons			PRICE			Number
	Diam.	L'gth under Eye	Inside	Outside	Safe Working Load	Average Load at Elastic Limit	Approximate Breaking Strain	Blank	Th'ded	Extra L'gth Blank per Inch or less	
3	**3/8**	1 1/4	1 1/8	1 7/8	.7	1.4	3.	$.11	$.16	$.02	**3**
4	**7/16**	1 3/8	1 3/16	2 1/16	1.	2.	4.	.12	.17	.02	**4**
5	***1/2**	1 1/2	1 9/32	2 1/4	1.3	2.5	5.	.14	.20	.03	**5**
6	**9/16**	1 5/8	1 3/8	2 1/2	1.5	3.	6.	.17	.24	.03	**6**
7	**5/8**	1 3/4	1 1/2	2 3/4	2.	4.	8.	.22	.30	.04	**7**
8	**3/4**	2	1 11/16	3 1/8	3.	6.	12.	.30	.40	.04	**8**
9	**7/8**	2 1/4	1 7/8	3 1/2	3.5	7.	16.	.40	.52	.05	**9**
10	**1**	2 1/2	2 1/16	3 15/16	4.	8.	20.	.55	.69	.06	**10**
11	**1 1/8**	2 3/4	2 1/4	4 3/8	5.	10.	23.	.80	.96	.07	**11**
12	**1 1/4**	3	2 7/16	4 7/8	7.5	15.	33.	1.10	1.29	.08	**12**
14	**1 1/2**	3 1/2	2 13/16	5 5/8	9.	18.	42.	1.55	1.80	.10	**14**
15	**1 3/4**	3 3/4	3 1/8	6 1/2	11.	21.	53.	2.60	3.00	.14	**15**
16	**2**	4	3 1/2	7 1/4	13.	25.	68.	3.80	4.50	.18	**16**
17	**2 1/2**	5	4 1/8	8 1/2	16.	32.	85.	6.00	7.50	.28	**17**

*When ordering V Thread state if 12 or 13 threads are wanted.

"VULCAN"

WELDLESS EYE BOLTS

Shoulder Pattern

Blank or Threaded

These Eye Bolts are submitted to a special refining process, or "heat treatment," after forging, which increases their strength and toughness and reduces the liability of breakage.

To insure proper service at listed capacity, every Eye Bolt, after heat treatment and before threading, is proof-tested to **fifty per cent. beyond** its rated "Safe Working Load."

Each Eye Bolt so tested is stamped **O** near its piece number which appears in raised letters on the forging and hence can be readily identified as **"proof-tested."**

Threaded Eye Bolts of standard length are in stock with U. S. Standard thread running up the shank from 1/8 to 3/8 inch of shoulder, which is faced; prices for these are for either U. S. or Whitworth Standard Threads; special threads extra.

Tobin Bronze Eye Bolts for marine work from standard or special dies to order in quantities; prices on application.

Prices given for Special Eye Bolts on receipt of drawings or models and specifications.



When ordering, please state whether Blank or Threaded are desired; if not specified, Blank (shank not threaded) will be sent.

Number	Shank		Diameter Eye		Capacity, Net Tons			PRICE			Number
	Diam.	L'gth under Shld.	Inside	Outside	Safe Working Load	Average Load at Elastic Limit	Approximate Breaking Strain	Blank	Th'ded	Extra L'gth Blank per Inch or less	
21	**1/4**	1	11/16	1 1/16	.2	.4	1.4	$.09	$.14	$.01	**21**
22	**5/16**	1 1/8	13/16	1 5/16	.3	.6	2.	.10	.15	.01	**22**
23	**3/8**	1 1/4	1	1 9/16	.6	1.3	3.	.11	.16	.02	**23**
24	**7/16**	1 3/8	1 3/32	1 3/4	.8	1.6	4.	.12	.17	.02	**24**
25	***1/2**	1 1/2	1 3/16	2	1.	2.	5.	.14	.20	.03	**25**
26	**9/16**	1 5/8	1 9/32	2 1/8	1.3	2.5	6.	.17	.24	.03	**26**
27	**5/8**	1 3/4	1 3/8	2 3/8	1.5	3.	8.	.22	.30	.04	**27**
28	**3/4**	2	1 1/2	2 5/8	2.3	4.5	12.	.30	.40	.04	**28**
29	**7/8**	2 1/4	1 21/32	3	3.	6.	13.	.40	.52	.05	**29**
30	**1**	2 1/2	1 13/16	3 3/8	3.5	7.	19.	.55	.69	.06	**30**
31	**1 1/8**	2 3/4	2	3 11/16	4.5	9.	23.	.80	.96	.07	**31**
32	**1 1/4**	3	2 1/8	4	5.5	11.	33.	1.10	1.29	.08	**32**
34	**1 1/2**	3 1/2	2 7/16	4 5/8	7.	13.	42.	1.55	1.80	.10	**34**
35	**1 3/4**	3 3/4	2 3/4	5 1/4	8.	16.	53.	2.60	3.00	.14	**35**
36	**2**	4	3 1/4	6 1/8	10.	20.	68.	3.80	4.50	.18	**36**

*When ordering V Thread state if 12 or 13 threads are wanted.

MISCELLANEOUS EYE BOLTS

Weldless



Type A



Type B

These Eye Bolts are submitted to a special refining process after forging which increases their strength and toughness and reduces the liability of breakage.

They are furnished in two styles or types, A and B, and are carried in stock with shanks blank (not threaded), but will be supplied threaded to order.

Full size drawings will be sent on request.

Type	Number	Shank		Diameter Eye		PRICE Blank	Type	Number
		Diameter	Length	Inside	Outside			
A	**1**	**1/4**	3/4	3/8	3/4	$.07	**A**	**1**
	10	**3/8**	3	3/4	1 3/8	.12		**10**
	15	**1/2‡**	2	9/16	1 1/4	.11		**15**
	16	**1/2‡**	13/16	1 3/8	2 3/8	.20		**16**
A	**17**	**1/2**	4	1	1 3/4	.16	**A**	**17**
	25	**5/8**	1 3/4	7/8	1 5/8	.14		**25**
	26	**5/8**	*1 3/4	1 1/8	2	.17		**26**
	55	**1**	1 5/16	7/8	2 3/8	.30		**55**
B	**1**	**1/4**	1/2	3/8	3/4	.05	**B**	**1**
	10	**7/16**	1 1/8	1	1 3/4	.11		**10**
	15	**1/2‡**	*1 9/16	13/16	1 13/16	.12		**15**
	16	**1/2‡**	3 3/8	7/16	1 7/16	.12		**16**
B	**17**	**†1/2‡**	1 3/4	1/2	1 1/8	.10	**B**	**17**
	25	**†5/8**	2 3/8	1/2	1 1/4	.12		**25**
	26	**5/8**	2 3/4	11/16	1 11/16	.13		**26**
	27	**5/8**	3/4	1 1/2	2 1/2	.15		**27**
B	**30**	**†11/16**	2 1/2	9/16	1 7/16	.14	**B**	**30**
	35	**†3/4**	2 3/4	5/8	1 5/8	.16		**35**
	45	**7/8**	4 1/8	1 1/8	2 3/8	.35		**45**
	55	**1**	2 3/4	3/4	2	.25		**55**

†Shanks of B 17, 25, 30 and 35 are 7/16, 1/2, 9/16 and 5/8 inch in diameter for 3/4, 1 and 1 1/8 inch from end respectively.

*Can be furnished longer if desired.

‡When ordering V Thread state if 12 or 13 threads are wanted.

"VULCAN" SWIVELS

For Hoist Hooks



These are made of a fine grade of mild steel suitable for welding and are designed for use with the Vulcan Hooks of corresponding numbers as listed.

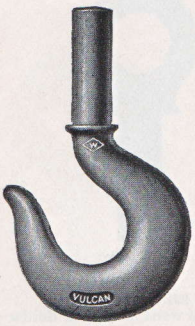
The Basket or Hub is made solid, requiring drilling before use, and the arms must be welded together to form a link after the shank of the Hook has been inserted and secured.

Number	For Vulcan Hook Number	Extreme Dimensions		Basket			Arms		PRICE	Number
		Length	Width	Length	Large Diam.	Small Diam.	Diam.	Length		
4	4	3 7/16	2	7/8	1 1/2	1 3/16	3/8	2 1/2	$.25	**4**
5	5	3 7/8	2 1/4	1 1/16	1 5/8	1 1/4	7/16	2 3/4	.30	**5**
6	6	4 3/8	2 1/2	1 5/16	1 7/8	1 3/8	1/2	3	.38	**6**
7	7	4 3/4	2 3/4	1 7/16	2 1/16	1 1/2	9/16	3 1/4	.48	**7**
8	8	6	3 3/16	1 9/16	2 1/4	1 3/4	5/8	4 3/8	.60	**8**
9	9	6 1/2	3 1/2	1 7/8	2 3/4	2 3/16	11/16	4 1/2	.90	**9**

"VULCAN"

HOIST HOOKS

With Shank



These Hooks are submitted to a special refining process or "heat treatment" after forging which increases their strength and toughness and reduces the liability of breakage.

To insure proper service at listed capacity every Hook, after heat treatment, is proof-tested to **fifty per cent. beyond** its rated "Safe Working Load."

Each Hook so tested is stamped **O** near its piece number which appears in raised letters on the forging and hence can be readily identified as **"proof-tested."**

Tobin Bronze Hooks from standard or special dies to order in quantities; prices on application.

*Shanks of Nos. 14, 15, 15½ and 16 can be made longer if desired at a slight additional charge.

Number	Shank		Extreme Dimensions		Capacity, Net Tons			PRICE	Number
	Diam.	Length	Length	Width	Safe Working Load	Average Load at Elastic Limit	Approximate Load Required to Straighten out		
2	1/2	2	4 1/4	2 7/8	.5	.9	1.9	$.15	**2**
3	9/16	2 1/4	4 3/4	3 1/8	.6	1.2	2.3	.18	**3**
4	5/8	2 1/2	5 1/4	3 1/2	.7	1.5	3.	.21	**4**
5	3/4	2 3/4	6	3 7/8	1.2	2.5	5.7	.27	**5**
6	7/8	3	6 3/4	4 3/8	1.7	3.5	7.	.36	**6**
7	1	3 1/4	7 1/2	4 7/8	2.1	4.2	8.5	.50	**7**
8	1 1/8	3 1/2	8 1/2	5 5/8	2.5	5.4	10.	.70	**8**
9	1 1/4	3 3/4	9 1/2	6 3/8	3.	6.2	13.	.95	**9**
10	1 3/8	4	10 1/4	6 7/8	4.	8.	17.	1.25	**10**
11	1 1/2	4 1/4	11 1/8	7 1/2	4.7	9.	19.	1.65	**11**
12	1 5/8	4 1/2	12 1/2	8 1/4	5.5	11.	26.	2.25	**12**
13	1 3/4	5	13 7/8	9 1/4	6.8	13.	32.	3.50	**13**
14	2	*5 1/2	15 5/8	10 7/8	8.	17.	35.	6.00	**14**
15	2 3/8	*6	17 3/4	13	11.	21.	48.	10.00	**15**
15 1/2	2 1/2	*6 1/2	19 1/2	14	15.	25.	55.	16.00	**15 1/2**
16	2 3/4	*7	20 3/4	14 3/4	20.	40.	80.	24.00	**16**

For Swivels, see preceding page.

"VULCAN"

WELDLESS HOIST HOOKS

With Eye

These Hooks are submitted to a special refining process or heat "treatment," after forging which increases their strength and toughness and reduces the liability of breakage.

To insure proper service at listed capacity every Hook, after heat treatment, is proof-tested to **fifty per cent. beyond** its rated "Safe Working Load."

Each Hook so tested is stamped **O** near its piece number which appears in raised letters on the forging and hence can be readily identified as **"proof-tested."**



Tobin bronze Hooks from standard or special dies to order in quantities; prices on application.

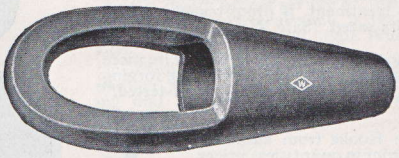


A Hook for Safety Chains on R. R. cars with eye at right angle to hook, can be furnished to order in reasonable quantities.

Full size drawing will be sent on request.

Number	Diameter of Eye		Extreme Dimensions		Capacity, Net Tons			PRICE	Number
	Inside	Outside	Length	Width	Safe Working Load	Average Load at Elastic Limit	Approximate Load Required to Straighten out		
22	3/4	1 1/2	4 3/8	2 7/8	.5	.9	1.9	$.15	**22**
23	7/8	1 3/4	4 7/8	3 1/8	.6	1.2	2.3	.18	**23**
24	1	2	5 3/8	3 1/2	.7	1.5	3.	.21	**24**
25	1 1/8	2 1/4	6 1/8	3 7/8	1.2	2.5	5.7	.27	**25**
26	1 1/4	2 1/2	6 3/4	4 3/8	1.7	3.5	7.	.36	**26**
27	1 3/8	2 3/4	7 5/8	4 7/8	2.1	4.2	8.5	.50	**27**
28	1 1/2	3	8 1/2	5 5/8	2.5	5.4	10.	.70	**28**
29	1 5/8	3 1/4	9 1/2	6 3/8	3.	6.2	13.	.95	**29**
30	1 3/4	3 1/2	10 1/4	6 7/8	4.	8.	17.	1.25	**30**
31	2	4	11 1/2	7 1/2	4.7	9.	19.	1.65	**31**
32	2 3/8	4 5/8	12 7/8	8 1/4	5.5	11.	26.	2.35	**32**
33	2 3/4	5 1/4	14 1/2	9 1/4	6.8	13.	32.	3.75	**33**
34	3 1/8	6 1/8	16 1/2	10 7/8	8.	17.	35.	7.50	**34**
35	3 1/2	7	19	13	11.	21.	48.	13.50	**35**
36	4	8 1/2	22	14 3/4	20.	40.	80.	30.00	**36**

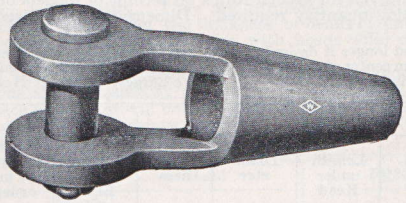
"VULCAN"
WELDLESS WIRE ROPE SOCKETS
CLOSED PATTERN



These are drop-forged from a fine grade of steel, making them superior in strength and finish to the heavier hand-made product.

Number	Size Rope	Extreme Length	Basket			PRICE	Number
			Length	Large Diameter Outside	Small Diameter Outside		
2	**1/4**	3 3/4	1 9/16	1 1/4	19/32	$.70	**2**
3	**5/16**	3 3/4	1 9/16	1 1/4	19/32	.70	**3**
4	**3/8**	4 15/16	2 1/4	1 7/16	3/4	.85	**4**
5	**7/16**	4 15/16	2 1/4	1 7/16	3/4	.85	**5**
6	**1/2**	5 7/16	2 1/2	1 3/4	7/8	1.10	**6**
7	**9/16**	5 7/16	2 1/2	1 3/4	7/8	1.10	**7**
8	**5/8**	6 1/4	2 3/4	2	1	1.35	**8**
9	**3/4**	7	3	2 3/16	1 1/8	1.65	**9**
10	**7/8**	8	3 1/2	2 5/8	1 7/16	1.85	**10**
11	**1**	9 1/4	4	3	1 5/8	2.40	**11**
12	**1 1/8**	10 3/8	4 1/2	3 1/2	2	3.30	**12**
13	**1 1/4**	11 1/2	5	3 7/8	2 1/4	4.50	**13**
14	**1 3/8**	12 9/16	5 1/2	4 1/2	2 5/8	6.00	**14**
15	**1 1/2**	12 9/16	5 1/2	4 1/2	2 5/8	6.80	**15**

"VULCAN"
WELDLESS WIRE ROPE SOCKETS
OPEN PATTERN



These are drop-forged from a fine grade of steel, making them superior in strength and finish to the heavier hand-made product.

The Pins are made of a superior grade of steel to obtain high shearing strength.

Furnished, regularly, complete with split-pin.

Number	Size Rope	Extreme Length	Basket			Diameter Pin	PRICE	Number
			Length	Large Diameter Outside	Small Diameter Outside			
102	**1/4**	3 1/4	1 9/16	1 1/4	19/32	7/16	$.85	**102**
103	**5/16**	3 1/4	1 9/16	1 1/4	19/32	7/16	.85	**103**
104	**3/8**	4 13/16	2 1/4	1 7/16	3/4	5/8	1.00	**104**
105	**7/16**	4 13/16	2 1/4	1 7/16	3/4	5/8	1.00	**105**
106	**1/2**	5 7/16	2 1/2	1 3/4	7/8	3/4	1.35	**106**
107	**9/16**	5 7/16	2 1/2	1 3/4	7/8	3/4	1.35	**107**
108	**5/8**	6	2 3/4	2	1	7/8	1.65	**108**
109	**3/4**	6 5/8	3	2 3/16	1 1/8	1	2.10	**109**
110	**7/8**	7 7/8	3 1/2	2 5/8	1 7/16	1 1/4	2.50	**110**
111	**1**	9 1/8	4	3	1 5/8	1 1/2	3.15	**111**
112	**1 1/8**	10 1/8	4 1/2	3 1/2	2	1 5/8	4.50	**112**
113	**1 1/4**	11 3/8	5	3 7/8	2 1/4	1 7/8	6.10	**113**
114	**1 3/8**	12 3/8	5 1/2	4 1/2	2 5/8	2	7.50	**114**
115	**1 1/2**	12 3/8	5 1/2	4 1/2	2 5/8	2	8.00	**115**

ROD ENDS

Unfinished



These Rod or Stub Ends are drop-forged from mild steel which welds easily. They may be used separately or in connection with Yoke Ends shown on opposite page.

Prices will be given for special forms on receipt of models or drawings and specifications stating quantity required. Dimensions show sizes of unfinished forgings.

* Can be furnished longer if desired.
† Head off-set from center of shank 3/64 inch.
‡ 1 1/4 inch hole in head.

a Largest Diameter Head 1 inch.
b Largest Diameter Head 1 1/8 inch.
c Largest Diameter Head 1 9/16 inch.

Number	Shank		Head		PRICE		Number
	Diameter	Length under Head	Diameter	Thickness	Standard Rod Ends	Extra Length per inch or less	
0B	**3/16**	4 13/16	3/8	1/4	$.06		**0B**
1B	**1/4**	2 11/16	9/16	1/2	.05		**1B**
1C	**1/4**	*5	5/8	1/4	.07	$.01	**1C**
1D	**1/4**	2 3/8	7/16	1/4	.04		**1D**
1 1/2A	**9/32**	*5	11/16	9/32	.07	.01	**1 1/2A**
2A	**5/16**	*3 3/4	3/4	7/16	.06	.01	**2A**
2B	**5/16**	3 1/8	3/4	5/16	.06		**2B**
2C	**5/16**	5 3/4	3/4	3/8	.09		**2C**
2D	**5/16**	1 1/4	13/16	3/8	.04		**2D**
3A	**3/8**	*2	1	3/8	.06	.02	**3A**
3B	**3/8**	*3 1/2	21/32*a*	3/4	.08	.02	**3B**
3C	**3/8**	*3 1/2	13/16	3/8	.06	.02	**3C**
3D	**3/8**	*3 1/2	9/16	9/16	.06	.02	**3D**
3E	**3/8**	3 1/8	5/8	5/8	.06		**3E**
3F	**3/8**	1 1/8	3/4	3/8	.04		**3F**
3G	**3/8**	1 7/16	5/8	3/8	.04		**3G**
3H	**3/8**	1 5/8	3/4	3/8	.05		**3H**
3J	**3/8**	3 1/16	7/8	3/8	.06		**3J**
4B	**7/16**	*4 1/2	15/16	5/8	.09	.02	**4B**
4C	**7/16**	*3 1/2	13/16*b*	3/4	.09	.02	**4C**
4D	**7/16**	*2 1/2	5/8	1/2	.06	.02	**4D**
4E	**7/16**	1 3/4	13/16	5/16	.05		**4E**
5A	**1/2**	*4 3/8	1	1/2	.09	.03	**5A**
†5B	**1/2**	2 3/8	3/4	3/4	.07		**†5B**
5C	**1/2**	3 1/16	7/8	7/16	.08		**5C**
5D	**1/2**	*3	3/4*b*	13/16	.09	.03	**5D**
5E	**1/2**	2 1/8	1 1/16	9/16	.07		**5E**
5F	**1/2**	2 1/16	13/16	11/32	.06		**5F**
5G	**1/2**	*12	1	7/16	.28	.03	**5G**
6A	**9/16**	2	1 1/16	7/16	.07		**6A**
6B	**9/16**	1	7/8	11/16	.06		**6B**
6C	**9/16**	2 3/8	15/16	3/8	.07		**6C**
6 1/2A	**19/32**	4 5/16	7/8	5/16	.09		**6 1/2A**
7A	**5/8**	*2 3/8	1 1/8	15/32	.08	.04	**7A**
7B	**5/8**	*4 7/8	1 1/4	19/32	.14	.04	**7B**
7C	**5/8**	1 1/2	1 3/4	5/8	.11		**7C**
7D	**5/8**	*7 1/2	1 5/32	21/32	.18	.04	**7D**
7E	**5/8**	*6	1 1/8*c*	1 1/16	.22	.04	**7E**
7F	**5/8**	*4 1/2	1 7/16	11/16	.15	.04	**7F**
7G	**5/8**	2 5/16	1	7/16	.07		**7G**
7H	**5/8**	2 15/16	1 1/16	7/16	.09		**7H**

(Continued on next page)

YOKE ENDS

Unfinished



These are designed for use with Rod Ends shown and are drop-forged from mild steel which welds easily. They are furnished regularly with the slots milled 1/32 inch narrower than the thickness of heads of corresponding Rod Ends, but they can be supplied to order with heads solid or with openings milled to other standard sizes stated in table.

Prices will be given for special forms on receipt of models or drawings and specifications stating quantity required.

Forgings with milled slot will be sent unless differently specified; dimensions otherwise are of unfinished forgings.

Shanks can be furnished longer if desired.

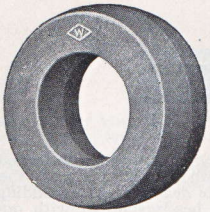
Number	For Use with Rod End Number	Shank		Head			PRICE			Number
		Diam.	Standard Length under Head	Length	Thickness	Width Milled Slot	Blank Without Slot	With Slot Milled	Extra Length, per Inch or less	
102A	**2A**	5/16	2 3/4	1 1/16	13/16	13/32	$.08	$.10	$.01	**102A**
103A	**3A**	3/8	2 7/8	1 5/16	3/4	11/32	.09	.12	.02	**103A**
104A		7/16	3 1/8	1 1/4	13/16	13/32	.10	.13	.02	**104A**
105A	**5A**	1/2	3 1/4	1 3/8	15/16	15/32	.13	.17	.03	**105A**
106A	**6A**	9/16	3 3/8	1 7/16	1 1/16	13/32	.17	.21	.03	**106A**
107B	**7B**	5/8	3 1/2	1 5/8	1 3/16	9/16	.22	.28	.04	**107B**
109A	**9A**	3/4	3 5/8	2 3/16	1 5/16	19/32	.30	.38	.04	**109A**
114A	**14A**	1 1/16	4 1/4	2 5/8	1 7/8	1 3/32	.60	.75	.06	**114A**

ROD ENDS

(Continued from preceding page 90)

Number	Shank		Head		PRICE		Number
	Diameter	Length under Head	Diameter	Thickness	Standard Rod Ends	Extra Length per inch or less	
9A	**3/4**	*3 7/8	1 3/4	5/8	$.20	$.04	**9A**
9B	**3/4**	*4	1 1/2	13/16	.20	.04	**9B**
9C	**3/4**	*4 3/8	1 1/8	3/4	.15	.04	**9C**
9D	**3/4**	3 7/8	1 1/8	1/2	.11		**9D**
11A	**7/8**	*3 1/2	1 1/2	1 3/64	.20	.05	**11A**
11B	**7/8**	*4	2	15/16	.28	.05	**11B**
11C	**7/8**	4 3/4	1 7/16	5/8	.20		**11C**
‡13A	**1**	*6	2 15/16	1 1/4	.85	.06	**‡13A**
13B	**1**	*3 1/2	1 5/8	1 31/64	.30	.06	**13B**
14A	**1 1/16**	*5 3/4	2 1/16	1 1/8	.45	.06	**14A**
15A	**1 1/8**	*5	1 13/16	1 1/8	.40	.07	**15A**
15B	**1 1/8**	*6	2 1/4	1 1/4	.50	.07	**15B**
17A	**1 1/4**	*6	2 5/16	1 1/2	.60	.08	**17A**
19A	**1 3/8**	7 1/4	2 3/8	1 1/2	.70		**19A**

See references top page 90.



SHAFTING COLLARS OR BUSHINGS

Unfinished and Weldless

These are drop-forged from steel and hole is made scant to allow for finishing. **Other unfinished and weldless Drop-forged Rings, in lots of not less than 100 can be furnished in great variety from dies in stock; send specifications.**

Size Shaft	Outside Diameter	Width Face	PRICE	Size Shaft
15/16	1 13/16	13/16	$.09	15/16
1 3/16	2 1/16	7/8	.11	1 3/16
1 7/16	2 7/16	1	.14	1 7/16
1 11/16	2 13/16	1 1/16	.20	1 11/16
1 15/16	3 3/16	1 3/16	.26	1 15/16
2 3/16	3 9/16	1 5/16	.35	2 3/16
2 7/16	3 13/16	1 3/8	.44	2 7/16
2 11/16	4 3/16	1 7/16	.56	2 11/16
2 15/16	4 9/16	1 9/16	.70	2 15/16



KEY FORGINGS

Unfinished

These are drop-forged with sides tapered as shown by cut; they are from 1/32 to 1/16 inch wider than finished size, to allow for machining.
Taper in length 3/16 inch to 1 foot. Cut to special length if desired.

Width, Finished Size	Standard Length under Head	Maximum Length under Head	Thickness under Head Size Forgings	PRICE		Width, Finished Size
				Keys, per 100	Extra Inch or less per 100	
3/16	1 1/2	3 1/2	3/16	$ 4.00	$.90	3/16
1/4	2	4	1/4	4.25	1.00	1/4
5/16	2 1/2	4 1/2	9/32	4.75	1.10	5/16
3/8	3	5	5/16	5.50	1.25	3/8
7/16	3 1/2	5 1/2	11/32	6.50	1.40	7/16
1/2	4	6	7/16	8.00	1.60	1/2
9/16	4 1/2	6 1/2	15/32	10.00	1.80	9/16
5/8	5	7	1/2	12.50	2.05	5/8
11/16	5 1/2	7 1/2	9/16	15.00	2.20	11/16
3/4	6	8	5/8	18.00	2.30	3/4
7/8	7	9	11/16	21.50	2.60	7/8
1	8	10	3/4	26.00	2.90	1
1 1/8	9	11	13/16	35.00	3.40	1 1/8
1 1/4	10	12	7/8	50.00	4.00	1 1/4

PARTS FOR AMMONIA UNIONS

FERRULES

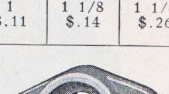
Unfinished and Weldless



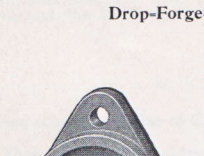
Size, for Pipe	**1/4**	**1/2**	**3/4**	**1**	**1 1/4**	**1 1/2**	**2**
Diameter outside	1 3/32	1 3/8	1 9/16	1 7/8	2 5/16	2 9/16	3 1/8
Diameter inside	17/32	13/16	1 1/16	1 1/4	1 9/16	1 15/16	2 3/16
Length	7/8	7/8	7/8	1	1	1 1/8	1 1/4
Price	$.05	$.06	$.07	$.09	$.11	$.14	$.26

FLANGES

Drop-Forged from Steel



1-4 to 1 1-2 inches inclusive



2 inches



1, 1 1-2, 2 and 2 1-2 inches

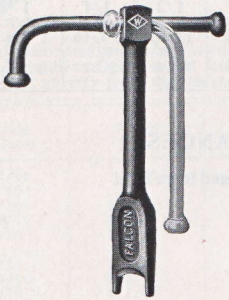
In addition to **Oval** and **Triangular Flanges** indicated in table, the following can be furnished in reasonable quantities:

Round Flanges (see cut), for 1, 1½, 2 and 2½ inch pipe.
Oval Flanges, with solid center, for ⅜ to ¾ inch pipe.
Square Flanges for 2 inch pipe.
Blue prints and prices on request.

Oval and Triangular

Size, for Pipe	**1/4**	**1/2**	**3/4**	**1**	**1 1/4**	**1 1/2**	**2**
Length over all	3 1/8	3 1/2	4	4 1/2	5	5 5/8	5
Width over all	1 11/16	2 1/16	2 1/4	2 9/16	2 7/8	3 1/4	
Thickness at center	1	1	1	1 1/4	1 3/8	1 3/8	1 3/8
Thickness at bolt-holes	7/16	7/16	7/16	1/2	9/16	9/16	9/16
Distance between bolt-holes (C to C)	2 1/4	2 1/2	2 7/8	3 1/4	3 5/8	4 1/8	4 1/16
Diameter of bolt holes	7/16	1/2	1/2	9/16	9/16	9/16	9/16
Diameter of recess for packing	1 3/32	1 3/8	1 9/16	1 7/8	2 5/16	2 9/16	3 1/8
Depth of recess for packing	5/16	5/16	5/16	3/8	3/8	3/8	3/8
Price	$.11	$.12	$.14	$.17	$.24	$.30	$.44

"FALCON"
WASTE PLUG
SPANNER



Trademark "Falcon" registered
Patent Pending

In addition to its obvious utility in the placement and removal of basin and sink grates, etc., this drop-forged Spanner will claim the attention of mechanics with desire for first-class tool equipment.

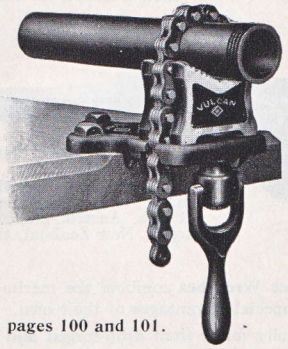
The Spanner is compact in design and made from a tough, strong grade of steel. The "fingers" are ground and the tool is hardened and tempered for severe service; it is otherwise unfinished. For convenience in cramped working quarters and space saving in the kit, an adjustable handle is furnished. Furnished with or without Pin Handle.

Unless otherwise specified Spanners with Handles will be sent.

Finger End			Handle		PRICE	
Extreme Width	Between Fingers	Extreme Length	Diameter	Length	Without Handle or Hole	With Handle and Hole
59/64	39/64	5 7/8	5/16	4 1/8	$.60	$.80

THE "VULCAN"
PATENT DROP FORGED
CHAIN PIPE VISE

For holding Pipe, Bolts, Bars, Shafts, etc., from 1-8 to 8 inches in diameter



Patented: In the United States and abroad.

Trademark "Vulcan," registered in Great Britain, France, Germany, Russia, Austria, Hungary, Belgium, Denmark, Sweden, Australia, New Zealand and the U. S. A.

See economy in use of Cable Code, pages 100 and 101.

These Vises are unbreakable, compact, rapid in action and positive in gripping pipe. All are equally serviceable upon and suitable for fastening to bench or post. The smaller sizes are well adapted for carrying by hand or in tool bag.

Adjustment is quickly effected by slightly turning the screw, and further quick adjustment is gained by engaging the projecting rivets of chain with a series of bosses on base.

They are made entirely of wrought steel; the drop-forged jaws are of saw-tempered steel for file-sharpening. The hand-made chains are of same quality as those of our Vulcan Chain Pipe Wrenches; all parts are fully guaranteed and replacements carried in stock.

The jaws of size No. 1 are designed to prevent the bending of weaker and smaller sizes of pipe, should an excess of chain pressure be placed upon them.

Orders for Chains take Screw also, unless otherwise specified.

Packed one in a box for convenient shelving.

Size, folded, for packing: No. 1, 4x 5x 6; weight, 4 lbs.
No. 2, 6x 8x 8; weight, 10 lbs.
No. 4, 8x10x12; weight, 30 lbs.

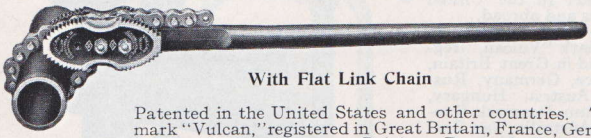
Number	For Pipe, Sizes	PRICES, VISES AND EXTRA PARTS							Number
		Vise, complete	Jaws	Chain with Screw	Screw	Handle and Nut	Nut	Washer	
1	**1/8 to 2**	$ 3.50	$1.20	$1.10	$.20	$.75	$.45	$.15	**1**
2	**1/4 to 4**	6.50	2.75	1.75	.35	1.50	.90	.25	**2**
4	**3/4 to 8**	18.00	7.50	4.75	.70	2.00	1.20	.45	**4**

THE "VULCAN"

Improved Pattern

PATENT DROP-FORGED CHAIN PIPE WRENCH

With Double-Ended Reversible Jaws for Turning or Holding Pipe, Pipe-Fittings, Etc., from 1-8 to 12 Inches Diameter



With Flat Link Chain

Patented in the United States and other countries. Trademark "Vulcan," registered in Great Britain, France, Germany, Russia, Austria, Hungary, Belgium, Denmark, Sweden, Australia, New Zealand, the U. S. A. and elsewhere.

These Wrenches combine the merits of all other chain pipe wrenches as well as special advantages of their own.

Wholly made from drop-forged and otherwise wrought steel, these tools are fully guaranteed and recommended as the most efficient and serviceable chain pipe wrenches made.

The Double-Ended Reversible Jaws, which may be quickly changed end for end as teeth first in use wear, greatly extend the life of the wrench and assure the **service of "two tools at the price of one."**

The fastening of Jaws to handle with two unusually tough steel studs makes repairs possible in emergencies, insures uninterrupted service of tool and prevents the jaws from spreading. One stud will withstand full working strength of tool, when necessary.

In the "straight-cut" teeth there is thorough distribution of gripping pressure; the tearing of pipe and one-spot wear of teeth will therefore be wholly prevented.

The Chains, actually proof-tested to two-thirds of their breaking strain, are hand-made from steel manufactured expressly for them; they swing from the center and can be used on either side of the jaws, thus reducing to the minimum the wear upon specific teeth.

The Handle design provides for the maximum of strength in the minimum of weight.

Proof-testing. To insure proper service, each **Flat Link Chain** is **"proof-tested"** in a standard tension machine up **to two-thirds of its breaking strain** listed in table. Each Chain, so tested, is Stamped **O** on the drop-forged swinging link, thus absolutely establishing the safety-factor and reliability of every wrench.

(Particulars continued on next page)

THE "VULCAN"

Improved or "Bijaw" Pattern

PATENT DROP-FORGED CHAIN PIPE WRENCH

With Double-Ended Reversible Jaws for Turning or Holding Pipe, Pipe-Fittings, Etc., from 1-8 to 12 Inches Diameter



With Cable Chain

All parts are interchangeable and replacements are carried in stock. With extra chains, swinging links are furnished and studs and nuts with extra jaws. Cable Chains are supplied only in regular lengths.

See economy in use of Cable Code, pages 100 and 101.

Number	30	31	32	33	33½	34	35	*16
Capacity, size pipe	⅛ to ⅜	⅛ to 1½	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12	4 to 18
Extreme Length..	13¾"	20"	27"	37"	44½"	50½"	64½"	87"
Weight.....	1¾	5¾	10	16	24	31	50	137
Flat Link Chain								
Length.....	9½	13½	17½	22½	31	39	54½	74½
Break'g strain,lbs.	3,600	6,700	9,800	12,500	14,300	15,700	21,600	40,000
Cable Chain								
Length.....	9¾	14½	18	27	33½	42	57	76
Size iron.....	3/16	9/32	11/32	7/16	15/32	23/64	37/64	13/16
Break'g strain,lbs	1,200	4,000	6,000	10,500	12,500	15,000	19,000	40,000
Price								
Complete Wrench	**$2.50**	**$3.50**	**$5.00**	**$7.00**	**$9.00**	**$11.00**	**$18.00**	**$40.00**
Extra Chain.....	.75	1.00	1.50	2.50	3.25	4.00	6.00	13.00
Extra Jaws, pair.	1.00	1.75	2.75	4.00	4.75	5.50	7.50	16.00
Extra Nuts and Studs for Jaws, per set.....	.20	.25	.35	.45	.55	.70	.90	

*Wrenches for pipe sizes larger than 12 inches are only supplied in the non-reversible jaw form—see No. 16 on page 98.

THE "VULCAN"

1896 Pattern (Old Style)

PATENT DROP-FORGED CHAIN PIPE WRENCH

For Turning or Holding Pipe, Pipe-Fittings, Etc., from 1-8 to 18 inches Diameter



With Flat Link Chain



With Cable Chain

Patented in the United States and other countries, Trademark "Vulcan," registered in Great Britain, France, Germany, Russia, Austria, Hungary, Belgium, Denmark, Sweden, Australia, New Zealand, the U. S. A. and elsewhere.

As originators of the world-wide established double-jaw Chain Pipe Wrenches we find the 1896 form of "Vulcan" tool still in demand by those with whom its efficiency has been established.

The Flat Link Chains are hand-made from steel manufactured expressly for them. To insure proper service, each is **"proof-tested"** in a standard tension machine up to **two-thirds of its "breaking strain"** as listed in table. **Each Chain** so tested is stamped **O** on the drop-forged swinging link, **thus absolutely establishing the safety factor** and reliability of every Wrench.

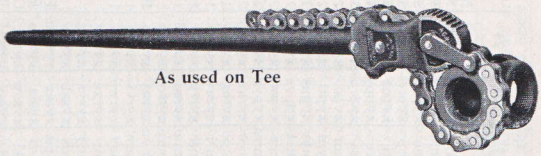
For manufacturing conditions see description of "Vulcan" Improved, pages 96 and 97.

Number	10	11	12	13	13½	14	15	16
Capacity								
Size Pipe	⅛ to ¾	⅛ to 1½	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12	4 to 18
Extreme Length	13¾	20	27	37	44½	50½	64½	87
Weight, lbs.	1¾	5¾	10	16	24	31	50	137
Flat Link Chain								
Length	9½	13½	17½	22½	31	39	54½	74½
Breaking Strain, lbs.	3,600	6,700	9,800	12,500	14,300	15,700	21,800	40,000
Cable Chain								
Length	9¾	14½	18	27	33½	42	57	76
Size Iron	3/16	9/32	11/32	7/16	15/32	33/64	37/64	13/16
Breaking Strain, lbs.	1,200	4,000	6,000	10,500	12,500	15,000	19,000	40,000
Price								
Complete Wrench	**$2.50**	**$3.50**	**$5.00**	**$7.00**	**$9.00**	**$11.00**	**$18.00**	**$40.00**
Extra Chain	.75	1.00	1.50	2.50	3.25	4.00	6.00	13.00
Extra Jaws, pair	1.00	1.75	2.75	4.00	4.75	5.50	7.50	16.00
Extra Screws and Pins, per set	.20	.22	.25	.30	.35	.40	.50	1.30

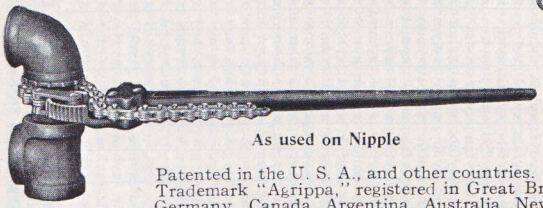
THE "AGRIPPA"

PATENT DROP-FORGED CHAIN PIPE-FITTINGS WRENCH

With Flat Link Chain Only



As used on Tee



As used on Nipple

Patented in the U. S. A., and other countries.
Trademark "Agrippa," registered in Great Britain, France, Germany, Canada, Argentina, Australia, New Zealand, the U. S. A., and elsewhere.

Many years' experience in the manufacture of the well-known "Vulcan" Chain Pipe Wrench has enabled us to produce in the "Agrippa" an unsurpassed tool for cramped and irregular fittings which cannot be effectively handled with broader wrenches. It is particularly serviceable on flanges, short nipples and R. & L. hand fittings. The Wrench is made entirely from wrought steel; the single jaw is tempered for file-sharpening; all parts are interchangeable and replacements are carried in stock.

The Chains are hand made from steel manufactured expressly for them. To insure proper service each is **"proof-tested"** in a standard tension machine up to **two-thirds of its "breaking strain"** as listed in table. Each Chain so tested is stamped **O** on the drop-forged swinging link, thus absolutely establishing the **safety-factor** and **reliability** of every Wrench.

See economy in use of Cable Code, pages 100 and 101.

Number	20	21	22	23	23 1/2	24	25
Capacity							
Fittings	⅛ to ¾	⅛ to 1½	¼ to 2½	¾ to 4	1 to 6	1½ to 8	2 to 12
Extreme Length, inches	13¾	20	27	37	44½	50½	64½
Weight, lbs	2½	5¼	9¾	17	24	32	56
Chain							
Length, inches	10	15	19½	26	34	45	61
Breaking strain, lbs	3,600	6,700	9,800	12,500	14,300	15,700	21,800
Price							
Complete Wrench	**$2.50**	**$3.50**	**$5.00**	**$7.00**	**$9.00**	**$11.00**	**$18.00**
Extra Chain	1.00	1.25	1.75	2.75	3.75	4.50	6.75
Extra Jaws, each	1.00	1.75	2.75	4.00	4.75	5.50	7.50

CODE FOR CHAIN PIPE TOOLS

QUANTITY		—	½	1	2	3	4	5	6	10	12	15	20	24	QUANTITY	
No															No.	
30 Vulcan		xoxvy	xucdo	xufug	xujli	xumes	xupte	xutsy	xuxaf	xydah	xyhli	xylly	xynyp	xysvo	30 Vulcan	
31	"	xoxwu	xuceh	xufyf	xujme	xumir	xupur	xuttu	xuxbi	xydug	xyhme	xylmu	xypax	xyswi	31 "	
32	" Imp.	xoxxo	xucfi	xugam	xujna	xumly	xupva	xutuv	xuxce	xydyf	xyhna	xylno	xypew	xysxe	32 "	Imp.
33	" Pat-	xoxzi	xucge	xugel	xujol	xummu	xupyp	xutvo	xuxda	xyfam	xyhol	xylop	xypiv	xysyt	33 "	Pat-
33½	" tern	xozaf	xucha	xugfy	xujuk	xumno	xurax	xutwi	xuxed	xyfel	xyhuk	xylpi	xypot	xysza	33½ "	tern
34	"	xozbi	xucig	xuggu	xujyj	xumop	xurew	xutxe	xuxic	xyffy	xyhyj	xylre	xyppy	xytac	34 "	
35	"	xozce	xucof	xugho	xukar	xumpi	xuriv	xutyt	xuxob	xyfgu	xyjar	xylsa	xypru	xytba	35 "	
20 Agrippa		xozda	xucud	xugik	xukep	xumre	xurot	xutza	xuxuz	xyfho	xyjep	xylun	xypso	xyteb	20 Agrippa	
21	"	xozed	xucyc	xugji	xukin	xumsa	xurpy	xuvac	xybud	xyfil	xyjin	xylym	xypti	xytiz	21 "	
22	"	xozic	xudak	xugke	xukjy	xumun	xurru	xuvba	xybyc	xufji	xyjku	xymav	xypus	xytox	22 "	
23	"	xozob	xudcy	xugla	xukku	xumym	xurso	xuveb	xycak	xyfke	xyjlo	xymet	xypve	xytty	23 "	
23½	"	xozuz	xuddu	xugoj	xuklo	xunav	xurti	xuviz	xyccy	xyfla	xyjmi	xymis	xypwa	xytuw	23½ "	
24	"	xozwy	xudej	xuguh	xukmi	xunet	xurus	xuvox	xycdu	xyfoj	xyjne	xymnu	xypyr	xytvu	24 "	
25	"	xozxu	xudfo	xugyg	xukne	xunis	xurve	xuvty	xycej	xufuh	xyjom	xymor	xyraz	xytwo	25 "	
10 Vulcan		xozyx	xudgi	xuhan	xukom	xunmy	xurwa	xuvuw	xycfo	xyfyg	xyjpa	xympo	xyrex	xytxi	10 Vulcan	
11	"	xozzo	xudhe	xuhem	xukpa	xunnu	xuryr	xuvvu	xycgi	xygan	xyjul	xymri	xyrov	xytyv	11 "	
12	"	xubah	xudih	xuhgy	xukul	xunor	xusaz	xuvwo	xyche	xygem	xyjyk	xymse	xyrry	xytze	12 "	
13	" Old	xubbu	xudja	xuhhu	xukyk	xunpo	xusex	xuvxi	xycih	xyggy	xykas	xymta	xyrsu	xyvad	13 "	Old
13½	" Style	xubco	xudog	xuhil	xulas	xunri	xusov	xuvyv	xycja	xyghu	xyker	xymup	xyrto	xyvbe	13½ "	Style
14	"	xubdi	xuduf	xuhjo	xuler	xunse	xusry	xuvze	xycog	xygil	xykip	xymyn	xyrut	xyvca	14 "	
15	"	xubeg	xudyd	xuhki	xulip	xunta	xusso	xuwad	xycuf	xygjo	xyklu	xynaw	xyrvi	xyvec	15 "	
16	"	xubfe	xufal	xuhle	xulky	xunup	xustu	xuwbe	xycyd	xygki	xykmo	xynev	xyrwe	xyvib	16 "	
1	" Vise	xubga	xufdy	xuhma	xullu	xunyn	xusut	xuwca	xydal	xygle	xykni	xynit	xyrxa	xyvoz	1 "	Vise
2	"	xubif	xufek	xuhok	xulmo	xupaw	xusvi	xuwec	xyddy	xygma	xykon	xynny	xyrys	xyvux	2 "	
4	"	xubod	xuffu	xuhuj	xulni	xupev	xuswe	xuwib	xydek	xygok	xykpe	xynos	xysab	xyvvy	4 "	
Pairs of Jaws		xubuc	xufgo	xujap	xulon	xupit	xusxa	xuwoz	xydfu	xyguj	xykra	xynpu	xysez	xyvwu	Pairs of Jaws	
Flat Link Chain		xubyb	xufhi	xujen	xulpe	xupny	xusys	xuwux	xydgo	xyhap	xykum	xynro	xysix	xyvxo	Flat Link Chain	
Cable Chain		xubzy	xufij	xujhy	xulra	xupos	xutab	xuwvy	xydhi	xyhen	xykyl	xynsi	xysow	xyvzi	Cable Chain	
Base		xucaj	xufje	xujim	xulum	xuppu	xutez	xuwwu	xydij	xyhim	xylat	xynte	xyssy	xywaf	Base	
Chain and Screw		xucby	xufka	xujiu	xulyl	xupro	xutix	xuwxo	xydje	xyhju	xyles	xynur	xystu	xywce	Chain and Screw	
Handle and Nut		xuccu	xufoh	xujko	xumat	xupsi	xutow	xuwzi	xydka	xyhko	xylir	xynva	xysuv	xywda	Handle and Nut	

NOTICE—Join two Code Words and cable as one word—EXAMPLES:

A dispatch reading (**xymet**) would order 15 Agrippa Wrenches No. 23. A dispatch reading (**xyfelxydek**) would order 10 "Vulcan" Bijaw Pattern Wrenches No. 33½ and 6 Vises No. 4 A dispatch reading (**xygujxoxzi xusxaxubga**) would order 10 pairs of Jaws for "Vulcan" Bijaw Pattern Wrench No. 33, and 4 pairs of Vise Jaws No. 1.

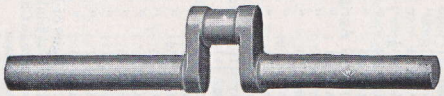
QUANTITY	25	30	36	40	48	50	60	72	84	96	100	144	QUANTITY
No.													No.
30 "Vulcan"	xywed	xyzzy	ybnam	ybtfu	ycfyk	yclel	ycpos	ycwew	ydgka	ydmel	ydtbo	ydzgi	30 "Vulcan"
31 "	xywic	ybbaz	ybnep	ybtgy	ycgeg	yclib	ycput	ycwil	ydgle	ydmib	ydtcu	ydzho	31 "
32 " Imp.	xywob	ybbha	ybnif	ybtik	ycgiw	yclon	ycpyv	ycwoy	ydgmi	ydmon	ydtdy	ydzin	32 " Imp.
33 " Pat-	xywuz	ybbis	ybnos	ybtox	ycgoj	yclra	ycrer	ycwuz	ydgno	ydmup	ydtes	ydzja	33 " Pat-
33½ " tern	xywwy	ybbje	ybnut	ybtuy	ycguk	yclse	ycrig	ycwyb	ydgoh	ydnal	ydtih	ydzky	33½ " tern
34 "	xywxu	ybbki	ybnyo	ybtyz	ycgti	yclti	ycrot	ycxca	ydgpu	ydnic	ydtuw	ydzob	34 "
35 "	xywyx	ybblo	ybpan	ybtza	ycheh	yclup	ycruv	ycxde	ydgry	ydnur	ydtxa	ydzuc	35 "
20 Agrippa	xywzo	ybbmu	ybper	ybvat	ychix	yclvo	ycsbo	ycxex	ydguu	ydnys	ydtye	ydzyz	20 Agrippa
21 "	xyxag	ybbof	ybpig	ybvew	ychma	yclwu	ycscu	ycxfi	ydgyk	ydpam	ydtzi	yfbax	21 "
22 "	xyxbo	ybbug	ybpot	ybvik	ychne	yclxy	ycsdy	ycxgo	ydhaf	ydpen	ydvij	yfbey	22 "
23 "	xyxci	ybcab	ybpuv	ybvoy	ychok	ycmem	ycses	ycxhu	ydheg	ydpid	ydvow	yfbin	23 "
23½ "	xyxde	ybced	ybrap	ybvuz	ychpi	ycmop	ycsih	ycxim	ydhiw	ydpor	ydvux	yfbob	23½ "
24 "	xyxef	ybcit	ybres	ybvyb	ychro	ycmsa	ycsov	ycxjy	ydhoj	ydpus	ydwat	yfbuc	24 "
25 "	xyxfa	ybcog	ybrih	ybwav	ychsu	ycmte	ycsuw	ycxoz	ydhuk	ydpyt	ydwev	yfbyd	25 "
10 "Vulcan"	xyxid	ybcuh	ybrov	ybwex	ychty	ycmur	ycsxa	ycxub	ydhyl	ydran	ydwik	yfcay	10 "Vulcan"
11 "	xyxoc	ybdac	ybruw	ybwim	ychul	ycmvi	ycsye	ycxyc	ydjag	ydrep	ydwox	yfcez	11 "
12 "	xyxub	ybdef	ybsar	ybwoz	ycjej	ycmwo	ycszi	ycyey	ydjok	ydrif	ydwuy	yfcip	12 "
13 " Old	xyxxy	ybdiv	ybsbi	ybwub	ycjol	ycmxu	yctbi	ycyin	ydjul	ydros	ydwyz	yfcoc	13 " Old
13½ " Style	xyxyz	ybdoh	ybsdu	ybwyc	ycjum	ycmys	yctco	ycyob	ydjym	ydrut	ydxav	yfcud	13½ " Style
14 "	xyxzu	ybdry	ybset	ybxaw	ycjyn	ycnen	yctdu	ycyuc	ydkah	ydsap	ydxew	yfcyf	14 "
15 "	xyzah	ybduj	ybsfy	ybxey	yckek	ycnid	yctet	yczez	ydkej	ydxbu	ydxil	yfdaz	15 "
16 "	xyzbu	ybdyk	ybsii	ybxin	yckiz	ycnor	yctfy	yczfa	ydkol	ydsgy	ydxuz	yfdeb	16 "
1 " Vise	xyzco	ybfad	ybsow	ybxob	yckon	ycnta	yctij	yczge	ydkum	ydser	ydxyb	yfdir	1 " Vise
2 "	xyzdi	ybfeg	ybsux	ybxuc	yckpa	ycnus	yctow	yczhi	ydkyn	ydsic	ydyaw	yfdod	2 "
4 "	xyzeg	ybfiw	ybsya	ybxyd	yckre	ycnve	yctux	yczip	ydlaj	ydsot	ydyex	yfduf	4 "
Pairs of Jaws	xyzfe	ybfoj	ybsze	ybyax	yckss	ycnwi	yctya	yczjo	ydlek	ydsuw	ydyim	yfdyg	Pairs of Jaws
Flat Link Chain	xyzga	ybfuk	ybtas	ybyip	yckto	ycnxo	yctze	yczku	ydliz	ydswa	ydyub	yffab	Flat Link Chain
Cable Chain	xyzif	ybfyl	ybtbe	ybyoc	yckun	ycnyt	ycvev	yczly	ydlom	ydsxe	ydzax	yffec	Cable Chain
Base	xyzod	ybgab	ybtci	ybyud	yckvu	ycnzy	ycvik	yczoc	ydlun	ydsyf	ydzda	yffha	Base
Chain and Screw	xyzuc	ybgel	ybtdo	ybzay	yckwy	ycpep	ycvox	yczud	ydlyb	ydszo	ydzex	yffis	Chain and Screw
Handle and Nut	xyzyb	ybgix	ybtev	ybzeb	yckyp	ycpif	ycvyz	yczyf	ydmak	ydtar	ydzfe	yffje	Handle and Nut

NOTICE—Join two Code Words and Cable as one word—EXAMPLES

A dispatch reading (**xymet**) would order 15 Agrippa Wrenches No. 23. A dispatch reading (**xyfelxydek**) would order 10 "Vulcan" Bijaw Pattern Wrenches No. 33½ and 6 Vises No. 4. A dispatch reading (**xygujxoxzi xusxaxubga**) would order 10 pairs of Jaws for "Vulcan" Bijaw Pattern Wrench No. 33, and 4 pairs of Vise Jaws No. 1.

CRANK SHAFTS

Single Throw
Unfinished and Weldless



These are drop-forged from stiff, strong steel, and are made close to size leaving a minimum amount of stock for finishing. They are submitted to a special refining process after forging which increases their strength and toughness and reduces the liability of breakage.

Dimensions show sizes of unfinished forgings. Special Crank Shafts to order.

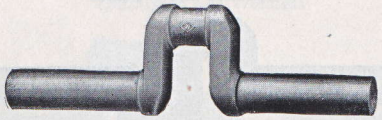
Send for blue prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Number	Stroke of Piston	Shafts: Diam.	Shafts: Lengths from Arms	Wrist Pin: Diam.	Wrist Pin: Length	Arms: Thickness	Arms: Distance Between	PRICE: Each	PRICE: For Extra Len'h, per inch or less
20A	**2**	1 1/16	8 & 8	1 1/16	1 7/16	3/8 & 9/16	1 7/16	1.80	$.06
25A	**2 1/2**	7/8	7 1/2 & 7 1/2	1	1 1/4	1/2 & 1/2	1 1/4	1.50	.05
30A	**3**	1 3/16	8 1/2 & 8 1/2	1 3/16	2 1/16	5/8 & 5/8	2 1/16	2.25	.07
30B	**3**	1 1/8	8 & 8	1 1/8	1 1/4	3/8 & 3/8	1 1/4	1.90	.07
35	**3 1/2**	1 1/4	8 1/2 & 8 1/2	1 1/8	1 1/16	9/16 & 9/16	1 1/2	2.00	.08
35A	**3 1/2**	1 7/16	9 1/2 & 9 1/2	1 7/16	1 5/8	1/2 & 1/2	1 15/16	3.00	.09
35B	**3 1/2**	1 7/16	9 1/2 & 9 1/2	1 3/8	1 1/2	5/8 & 5/8	1 1/2	2.85	.09
40A	**4**	1 11/16	11 & 11	1 11/16	1 13/16	5/8 & 5/8	2 1/8	4.00	.13
40B	**4**	1 1/4	8 1/2 & 8 1/2	1 1/4	1 11/16	13/16 & 13/16	1 11/16	2.15	.08
***45A**	**4 1/2**	1 5/8	*8 1/2 & 10 1/2	1 3/8	1 3/8	3/4 & 3/4	1 3/4	3.50	*.12
45B	**4 1/2**	1 5/8	10 1/2 & 10 1/2	1 5/8	1 3/4	11/16 & 11/16	2	4.50	.12
48A	**4 3/4**	1 11/16	11 & 11	1 11/16	1 7/8	5/8 & 5/8	2 1/4	4.50	.13
50A	**5**	1 5/8	10 1/2 & 10 1/2	1 3/4	1 5/8	13/16 & 13/16	2 1/4	4.50	.12
50B	**5**	1 5/8	10 1/2 & 10 1/2	1 5/8	2 1/8	7/8 & 7/8	2 1/8	4.25	.12
50C	**5**	1 7/8	12 1/2 & 12 1/2	1 7/8	2 1/8	7/8 & 7/8	2 1/8	6.00	.16
52	**5 1/4**	2	13 & 13	2	2 1/16	11/16 & 11/16	2 7/16	6.75	.18
60B	**6**	1 7/8	12 1/2 & 12 /12	1 5/8	2	5/8 & 5/8	2 1/2	5.75	.16
60C	**6**	1 3/4	11 1/2 & 11 1/2	1 3/4	2 11/16	1 5/16 & 1 5/16	2 11/16	7.00	.14
***60D**	**6**	1 15/16	*8 1/8 & 12 1/2	1 11/16	1 3/4	7/8 & 7/8	2 1/8	6.25	*.17
60E	**6**	2	13 & 13	2	2 5/8	1 & 1	2 5/8	8.75	.18
62	**6 1/4**	2 1/4	13 1/2 & 13 1/2	2 1/4	2 9/16	7/8 & 7/8	3	9.60	.22

* Short ends of Shaft cannot be made longer than stated in table.

CRANK SHAFTS

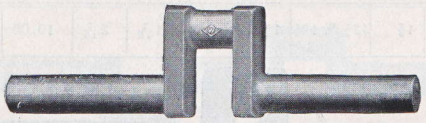
Single Throw
Unfinished and Weldless



These are drop-forged from stiff, strong steel, and are made close to size, leaving a minimum amount of stock for finishing. They are submitted to a special refining process after forging which increases their strength and toughness and reduces the liability of breakage.

Send for blue prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Number	Stroke of Piston	Shafts		Wrist Pin		Arms		PRICE	
		Diam.	Lengths from Arms	Diam.	Length	Thickness	Distance Between	Each	For Extra-L'th per Inch or less
25B	**2 1/2**	1 1/8	8 & 8	1 1/8	1 3/4	1/2 & 1/2	1 3/4	$2.10	$.07
35C	**3 1/2**	1 7/16	9 1/2 & 9 1/2	1 7/16	1 1/8	7/16 & 7/16	1 5/8	2.50	.09
†40C	**4**	1 1/2	9 1/2 & 9 1/2	1 1/2	1 11/16	3/4 & 3/4	†	3.65	.10
40D	**4**	1 1/4	8 1/2 & 8 1/2	1 1/4	1 1/4	3/8 & 3/8	1 5/8	2.40	.08
***45D**	**4 1/2**	1 5/8	*7 1/2 & 10 1/2	1 3/8	1 7/16	1/2 & 1/2	1 7/8	3.75	*.12
50D	**5**	1 5/8	10 1/2 & 10 1/2	1 5/8	1 3/4	5/8 & 5/8	2 1/8	4.25	.12
50E	**5**	1 11/16	11 & 11	1 11/16	2 1/16	7/16 & 7/16	2 1/16	4.75	.13
60F	**6**	1 11/16	11 & 11	1 11/16	2 1/16	3/4 & 3/4	2 3/4	5.00	.15
60G	**6**	1 13/16	12 & 12	1 13/16	2 1/16	3/4 & 3/4	2 11/16	5.75	.15
65A	**6 1/2**	1 13/16	12 & 12	1 13/16	2 5/16	21/32 & 21/32	3 1/16	6.50	.15
70	**7**	2 1/8	13 & 13	2 1/8	2 3/16	7/8 & 7/8	2 7/8	9.25	.20
85	**8 1/2**	2 1/2	14 & 14	2 1/2	2 1/4	1 1/2 & 1 1/2	3 1/8	15.00	.28



Dimensions show sizes of unfinished forgings. Special Crank Shafts to order.

45C	**4 1/2**	1 13/16	12 & 12	1 15/16	2 1/4	1 1/16 & 1 1/16	2 1/2	$7.25	$.15
60	**6**	1 11/16	11 & 11	1 3/4	1 3/8	1 3/16 & 1 3/16	1 3/8	6.25	.13
60A	**6**	1 3/4	11 1/2 & 11 1/2	1 3/4	2 1/4	7/8 & 7/8	2 1/4	6.00	.14
65	**6 1/2**	1 7/8	12 1/2 & 12 1/2	2 1/8	2 3/4	11/16 & 7/8	2 3/4	8.00	.16

† Arms not at right angle to centre line of shaft
* Short ends of Shaft cannot be made longer than shown in table.

CRANK SHAFTS

Double Throw—Two Bearings
Unfinished and Weldless

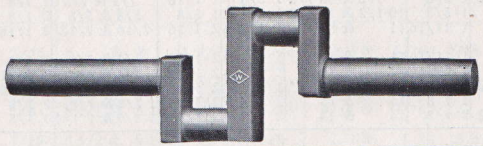


These are drop-forged from stiff, strong steel, and are made close to size, leaving a minimum amount of stock for finishing. They are submitted to a special refining process after forging which increases their strength and toughness and reduces the liability of breakage.

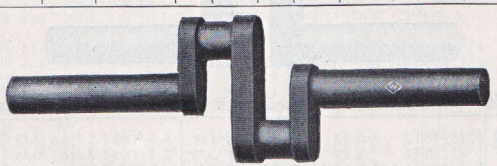
Dimensions show sizes of unfinished forgings. Special Crank Shafts to order.

Send for blue prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Number	Stroke of Piston	Shafts		Wrist Pins			Arms		PRICE		Number
		Diam	Lengths from Arm	Diam	Length	Dist. C. to C.	Thickness	Dist Between	Each	For Extra Length per Inch or Less	
235	**3 1/2**	1½	9½ & 9½	1½	1 7/16	2	9/16	1 7/16	$5.25	$.10	**235**
250A	**5**	1⅝ & 2	10½ & 13	1¾	1⅝	2⅝	⅝	2	8.75	.12 & 18	**250A**
***250B**	**5**	2	*3¼ & 13	2	2	3	1	2	8.50	*.18	***250B**
250C	**5**	2 1/16	13 & 13	2 1/16	2⅝	3¾	⅞	2⅜	13.50	.19	**250C**
252	**5 1/4**	1⅝ & 2	10½ & 13	2	2½	3½	⅞ & 1	2½	12.50	12 & 18	**252**



250	**5**	1⅞	12½ & 12½	1¾	2 7/16	3½	1 1/16	2 7/16	10.00	.16	**250**



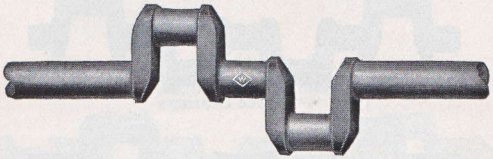
240	**4**	1½	9½ & 9½	1½	1 7/16	2¼	11/16 & 13/16	1 7/16	5.25	.10	**240**

* Short end of shaft cannot be furnished longer than shown in table.

CRANK SHAFTS

Double Throw—Three Bearings

Unfinished and Weldless



These are drop-forged from stiff, strong steel, and are made close to size, leaving a minimum amount of stock for finishing. They are submitted to a special refining process after forging which increases their strength and toughness and reduces the liability of breakage.

Send for blue prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Number	Stroke of Piston	Shafts		Wrist Pins			Length of Center Bearing	Arms		PRICE		Number
		Diameter	Lengths from Arm	Diameter	Length	Dist. C to C		Thickness	Dist. Between	Each	For Extra Length, per Inch or Less	
†240X	4	1½	9½ & 9½	1½	1 11/16	7¾	3⅜	¾	†	$5.50	$.10	240X†
245X	4 1/2	1⅝	10½ & 10½	1⅝	1 7/16	7⅛	3¾	½	1⅞	7.00	.12	245X
245XA	4 1/2	1 13/16	12 & 12	1 13/16	1⅞	7⅛	3⅛	9/16	1⅞	8.00	.15	245XA
250X	5	1¾	11½ & 11½	1¾	2 3/16	6⅜	2 5/16	15/16	2 3/16	8.00	.14	250X
250XA	5	1⅞	12½ & 12½	1⅞	2⅛	8 11/16	4 13/16	⅞	2⅛	11.00	.16	250XA
250XC	5	1 11/16	11 & 11	1 11/16	2 1/16	7¼	3 1/16	7/16	2 1/16	7.50	.13	250XC
260X	6	1⅝	12½ & 12½	1⅝	2 1/16	7½	2⅝	7/16	2 1/16	10.50	.16	260X



Dimensions show sizes of unfinished forgings. Special Crank Shafts to order.

230X	3	1⅜	9 & 9	1⅜	1 11/16	7	3 5/16	7/16	2	$5.00	$.09	230X
235X	3 1/2	1½	9½ & 9½	1¼	1⅜	6¾	4	1/16	1⅜	5.25	.10	235X
250XB	5	2 1/16	13 & 13	1 15/16	2¼	10½	5¾	½	3	14.50	.19	250XB

† Arms not at right angle to center line of shaft.

CRANK SHAFTS

Four Throw
Unfinished and Weldless

Type "X" Five Bearings



Type "Y" Three Bearings



Type "Z" Three Bearings



These are drop-forged from stiff, strong steel, and are made close to size leaving a minimum amount of stock for finishing. They are submitted to a special refining process after forging which increases their strength and toughness and reduces the liability of breakage.

Two-bearing, four cylinder, 4½" and 5 1/16" stroke Crank Shafts can be furnished to order in reasonable quantities, from available dies. Blue prints and details on application.

By the use of available dies, some of these can be supplied in reasonable quantities with flange forged integral with shaft. Flange dies for others can be made at moderate rates.

Dimensions show sizes of unfinished forgings. Special Crank Shafts to order.

Send for blue prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Type and Number	Stroke of Piston	Shafts: Diameter	Shafts: Length from Arms	Wrist Pins: Diameter	Wrist Pins: Length	Wrist Pins: Distance C. to C.	Length of Center Bearing	Thickness of Arms	PRICE: Each	PRICE: For Extra Length, per Inch or less	Type and Number
432X	**3 1/4**	1 7/16 & 1 1/4	9 1/2 & 9	1 7/16	1 13/16	all 5 1/4	1 13/16	all 1 13/16	$7.50	$.09	**432X**
440Z	**4**	1 5/8 & 1 5/8	10 1/2 & 10 1/2	1 5/8	2 1/8	3 3/4 5 5/8 3 3/4	2 1/8	3/4 3/4 5/8 5/8 3/4 3/4	11.00	.12	**440Z**
440ZA	**4**	1 7/16 & 1 7/16	9 1/2 & 9 1/2	1 7/16	1 7/8	4 1/8 5 5/16	2 1/8	3/8 7/16	7.50	.09	**440ZA**
442X	**4 1/4**	1 7/16 & 1 7/16	9 1/2 & 9 1/2	1 7/16	1 15/16	all 5 25/32	1 27/32	all 1/2	13.00	.09	**442X**
445Z	**4 1/2**	1 3/4 & 1 3/4	11 1/2 & 11 1/2	1 7/8	2 3/8	5 3/8 7 1/8 5 3/8	2 1/2	3/4 11/16 7/8 7/8 11/16 3/4	15.00	.14	**445Z**
447Y	**4 3/4**	1 3/4 & 1 3/4	11 1/2 & 11 1/2	1 3/4	2 3/4 2 3/4	4 1/4 7 1/2 4 3/16	2 7/8	7/16 11/16 5/8 5/8 11/16 11/16	17.00	.14	**447Y**
450Z	**5**	2 & 2	13 & 13	2	2 1/4	3 3/8 4 7/8	2 1/4	11/16 13/16 1/2	22.00	.18	**450Z**
450ZA	**5**	1 7/8 & 1 7/8	12 1/2 & 12 1/2	1 7/8	2 1/2	4 4 7/8	3	5/8 11/16 3/4	21.00	.16	**450ZA**
455Z	**5 1/2**	2 3/8 & 2 3/8	13 1/2 & 13 1/2	2 3/8	1 3/8	all 7 3/8	2 7/8	5/8 2 5/8 2 5/8 2 5/8	28.00	.25	**455Z**

CRANK SHAFTS

Six Throw

Unfinished and Weldless

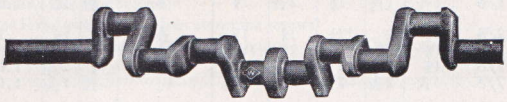
No. 640 X

Seven Bearings Stroke of Piston 4 inches



No. 645 Y

Four Bearings Stroke of Piston 4 1-2 inches



These shafts are not carried regularly in stock but can be furnished in reasonable quantities to order.

They are drop-forged from stiff, strong steel, and are made close to size leaving a minimum amount of stock for finishing. They are submitted to a special refining process after forging which increases their strength and toughness and reduces the liability of breakage.

Full size drawings on request.

Special Crank Shafts to order.

No. 645 Y, with Flange



CONNECTING RODS

With Clamping Lugs—Unfinished



Dimensions show sizes of unfinished forgings. Special Connecting Rods to order.

Send for blue prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Number	Length Center to Center	Bosses or Heads — Small Diam.	Small Thickness	Large Diam.	Large Thickness	Large Diam. Hole	Thickness Flange of Shank	Clamping Lugs Thickness	Clamping Lugs Length	PRICE	Number
12150	5 11/16	1 1/8	1 5/8	1 3/4	1 3/4	1 3/8	3/4	7/8	1 1/16	$.60	12150
12997	6 1/4	1 3/8	1 1/2	1 1/2	1 3/8	1 1/8	7/16	9/16	3/4	.60	12997
12228	7	1 3/16	1 27/32	1 15/16	1 1/2	1 9/16	1/2	5/8	1 9/16	.65	12228
23A	7 1/8	1 1/16	1 13/32	1 1/4	1 25/32	1 1/16	1/2	11/16	1 3/4	.65	23A
8145	7 1/8	1 1/16	1 9/16	1 3/4	2 1/16	1 3/8	1/2	11/16	1 5/8	1.00	8145
12405	7 3/8	*2 1/4	2	*2 1/4	1 3/8	1 7/8	9/16	2/3	1 1/2	.75	12405
12388	7 3/4	1 3/8	2 5/8	2 3/16	2 7/8	1 11/16	3/4	1	1 1/2	1.60	12388
12439	7 7/8	1 1/2	2	2	2	1 5/8	9/16	3/4	1 5/16	1.00	12439
29A	7 7/8	1 9/16	2 1/16	2 1/16	2 1/16	1 11/16	1	13/16	1 1/16	1.00	29A
12043	8	1 5/8	1 1/2	2	1 7/16	1 11/16	1/2	1/2	1 1/2	.70	12043
11303	8	1 3/8	2	2	†2 1/8	1 5/8	3/4	3/4	1 3/8	1.00	11303
11640	8	1 7/16	1 3/4	2 1/16	2 1/8	1 11/16	3/4	5/8	1 5/8	1.00	11640
8351	8 5/16	1 1/16	1 5/16	2 1/8	1 5/16	1 5/8	7/16	3/4	1 3/8	.70	8351
12138	8 3/8	1 1/16	2 1/8	2 9/16	2 1/8	2 1/16	3/4	1	1 7/8	1.50	12138
11490	8 1/2	1 5/16	2 1/8	2 1/4	2 7/16	1 3/4	3/4	7/8	1 5/8	1.25	11490
12151	8 9/16	1 1/2	2 1/16	2 1/2	3 1/16	2	1	1	1 1/2	2.00	12151
12670	8 5/8	1 1/4	1 7/8	2 3/16	2 1/4	1 7/8	5/8	5/8	1 3/8	1.15	12670
12303	9	1 5/8	2 5/8	2 5/8	2 1/8	2 1/8	3/4	3/4	2	1.65	12303
8449	9 1/8	1 1/4	1 15/16	2 1/8	1 9/16	1 3/4	5/8	7/8	1 1/2	1.15	8449
12134	9 3/4	1 1/2	2 1/8	2 3/8	2	1 7/8	1 5/32	7/8	1 11/16	1.65	12134
8459	10	1 1/4	1 13/16	2 7/16	1 9/16	1 15/16	3/4	3/4	1 3/4	1.25	8459
10341	10	1 3/8	1 1/2	2 3/16	1 5/8	1 3/4	7/8	7/8	1 5/8	1.35	10341
12208	10	1 1/16	2 1/2	2 1/2	2	2	1 1/8 to 1 1/4	1/4	1 1/2	1.90	12208
11170	10 1/4	1 27/32	1 13/16	2 5/8	1 13/16	2 1/8	3/4	3/4	1 1/2	1.65	11170
9630	10 1/2	1 5/8	2 1/16	2 3/8	†2 3/4	2	3/4	7/8	2 1/16	2.25	9630
9759	11 1/2	1 9/16	1 3/4	2 5/16	†2 1/4	1 7/8	3/4	3/4	1 9/16	1.75	9759
11168	11 1/2	1 3/16	2 1/2	2 5/8	†3	2	3/4	13/16	1 5/8	3.00	11168
9631	11 1/2	2 1/16	2 15/16	2 5/8	†3 1/16	2 1/8	7/8	1	2 3/16	4.25	9631
12979	11 7/8	1 3/4	1 5/32	2 1/2	2 1/8	1 3/4	7/8	*7/8	2 1/4	1.70	12979
12735	12	1 5/8	1 1/8	2 3/4	2 1/4	2 1/4	7/8	*3/4	2 1/8	1.70	12735
10381	12 1/2	1 3/4	3	2 3/4	2 3/8	2 3/8	*1 5/16 to 1 3/16	1	2 1/4	3.00	10381
11997	14 1/2	1 15/16	2 1/2	3 9/32	2 3/8	2 11/16	11/16	†2 1/8	2 5/16	3.50	11997

* Clamping Lug on small head. † Large Head designed for four clamping screws.

CONNECTING RODS

With Clamping Lugs
Elongated Hole in Large Head
Unfinished



To insure strength and service these are drop-forged from a selected, stiff steel.
* Clamping Lug on small head
† Large Head designed for four clamping screws.
Dimensions show sizes of unfinished forgings Special Connecting Rods to order

Send for blue prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Number	Length Center to Center	Bosses or Heads					Thickness Flange of Shank	Clamping Lugs		PRICE	Number
		Small		Large				Thickness	Len'h		
		Diam	Thickness	Diam	Thickness	Diam. Hole					
11278	**5 1/16**	1 1/16	1	1 3/16	1	1 5/16	3/8	3/8	2 7/32	$.28	**11278**
10627	**8 1/16**	1 3/16	1 1/16	1 3/8	1 3/16	1 1/16	1/2	1/2	1	.50	**10627**
11404	**11**	1 1/2	1 3/8	2 7/16	2 3/8	2	3/4	*2 1/8 †	1 11/16	2.50	**11404**
7991	**11 1/2**	1 9/16	2 7/16	2 1/2	2 13/16	2 1/16	9/16 to 1	1	1 7/8	2.50	**7991**
10584	**11 5/8**	1 7/16	3 1/8	2 5/8	2 1/4	2 1/8	7/8 to 1 1/8	1	1 7/8	2.25	**10584**
10005	**12**	1 3/4	2 5/8	2 5/8	2 3/8	2	1 3/8 to 1 1/4	1	1 3/8	2.75	**10005**
9348	**12**	1 11/16	2 15/16	2 5/8	3 11/16	2 5/16	3/4 to 1 1/16	†2 3/4	2	4.50	**9348**
8646	**12**	2	2 3/4	3 1/4	2 9/16	2 5/8	1 to 1 1/8	1 1/4	2 1/2	4.50	**8646**
8674	**12 1/2**	1 11/16	3 1/16	2 3/4	2 9/16	2 7/16	3/4 to 1 1/16	7/8	2 3/16	3.00	**8674**

CONNECTING RODS

With Separate Caps

Unfinished



To insure strength and service these are drop-forged from a stiff, selected steel.

Dimensions show sizes of unfinished forgings. Special Connecting Rods to order.

Send for blue prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Number	Length Center to Center	Bosses or Heads					Thickness Flange of Shank	Clamping Lugs		PRICE including Cap
		Small		Large				Thickness	Length	
		Diam	Thickness	Diam	Thickness	Diam Hole				
7942	**8**	1 1/8	1 3/4	2 3/8	1 3/4	1 3/4	7/16	3/4	1 11/16	$1.50
6268	**8**	1 5/16	2	2 1/2	1 9/16	1 7/8	3/4	3/4	1 11/16	1.65
7214	**8**	1 3/8	1 3/8	2 1/8	1 3/8	1 3/4	5/8	15/16	1 1/16	1.40
11763	**9 1/16**	1 9/32	1 3/8	2	1 3/8	1 3/8	5/8	5/8	1 1/8	1.45
8957	**10**	1 11/16	1 1/2	*2 3/4	2 1/16	2 1/4	3/4	1	1 9/16	2.30
8680	**11**	1 3/8	2 1/8	2 3/8	2 1/4	1 7/8	13/16	7/8	1 15/16	2 25
5312	**11**	1 3/4	2	2 3/4	1 5/8	1 7/8	1/2 to 11/16	1	1 3/4	1.90
5313	**11**	1 3/4	2	2 3/4	1 5/8	1 7/8	1/2 to 11/16	1	1 3/4	1.90

* Has Clamping Lug on small head.

CONNECTING RODS

Without Clamping Lugs

Unfinished



To insure strength and service these are drop-forged from a stiff, selected steel.

Dimensions show sizes of unfinished forgings. Special Connecting Rods to order.

Send for Blue Prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Number	Length Center to Center	Bosses or Heads				Thickness Flange of Shank	PRICE	Number
		Small		Large				
		Diam.	Thickness	Diam.	Thickness			
8A	5 5/16	11/16	1	13/16	13/16	3/16	$.20	8A
13A	5 7/8	3/4	7/8	1	7/8	1/4	.23	13A
*14A	5 15/16	1 13/32	3/4	1 13/32	3/4	5/8	.27	*14A
9958	6 1/2	5/8	3/4	1	3/4	5/16	.25	9958
†18A	6 9/16	1 5/16	11/16	1 5/16	11/16	5/8	.22	†18A
8189	7	7/8	1	1 5/8 [2]	3/4	5/16	.40	8189
8190	7	7/8	1	1 5/8 [2]	1 5/8	‡ 5/16	.55	8190
21A	7 3/32	13/16	7/8	1 1/16	1	7/32	.25	21A
10086	7 3/16	7/8 [3]	1 3/16	1 7/16 [3]	1 3/16	‡1/4	.40	10086
10148	7 3/16	7/8 [3]	1 3/16	1 1/8	1 3/16	1/4	.35	10148
9935	7 1/4	15/16	1 1/8	1 11/16 [1]	1 1/4	13/32	.45	9935
24A	7 5/16	27/32	7/8	1 5/32	1	5/16	.25	24A
9968	7 1/2	13/16	1 1/4	1 3/4	1 1/4	‡5/16	.50	9968
11801	7 1/2	29/32	1 1/16	2 3/8	15/16	1/4	.50	11801
27A	7 21/32	15/16	1 1/16	1 1/8	1 1/16	5/16	.35	27A
35A	8 11/16	15/16	1 1/16	1 3/4	1 9/16	3/8	.55	35A
46A	10 1/16	15/16	2 1/4	1 3/8	1 1/2	7/16	.75	46A

* Round shank; heads flush with shank on one side, projecting 1/8 inch from shank on other side.

†Round shank.

[1]Has 1 1/8" dia. hole in head.

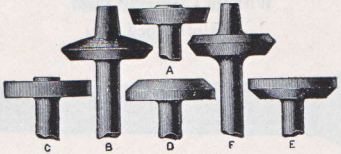
[2]Has 1 3/16" dia hole in head.

[3]Heads offset on same side of shank.

‡Has reinforcement under large head for slot to accommodate twin cylinder construction.

VALVE STEM FORGINGS

Unfinished and Weldless



These are regularly furnished from a fine grade of mild steel but can be made from nickel steel or other materials when required in reasonable quantities.

They are submitted to a special refining process after forging which increases their strength and toughness and reduces the liability of breakage.

Dimensions show sizes of unfinished forgings. Special Valve Stems to order.

Send for Blue Prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Type and Number	Head			Stem		Lug on Head		PRICE	For Extra Length per inch or less	Type and Number
	Large Diam.	Small Diam.	Thickness	Diam.	Length	Diam.	Length			
A 20	1 1/4	1 1/8	5/32	5/16	6 1/2	5/16	5/16	$.30	$.01	**A 20**
25	1 19/32	1 1/4	9/32	3/8	7 1/2	1/2	15/32	.30	.01	**25**
28	1 3/4	1 1/4	11/32	3/8	7 1/2			.30	.01	**28**
30	1 7/8	1 1/2	5/16	1/2	7 1/2	1/2	1/8	.35	.02	**30**
A 35	1 7/8	1 5/8	3/16	5/16	7 1/2	5/16	1/8	.30	.01	**A 35**
36	2	1 1/2	5/16	3/8	8 1/2	5/8	9/16	.35	.01	**36**
37	2 1/8	1 9/16	7/16	5/8	8 1/2	7/16	1/8	.40	.03	**37**
38	2 1/8	1 7/16	3/8	5/8	8 1/2	5/8	1/4	.40	.03	**38**
A 39	2 1/4	1 13/16	5/16	7/16	8 1/2			.40	.02	**A 39**
40	2 5/16	1 3/4	7/16	9/16	8 1/2	3/4	3/32	.40	.02	**40**
60	2 5/16	1 3/4	7/16	5/8	8 1/2	3/4	3/32	.45	.03	**60**
70	2 1/2	1 13/16	3/8	5/8	8 1/2	5/8	1/4	.40	.03	**70**
80	2 3/4	2 3/16	7/16	5/8	9	3/4	3/32	.50	.03	**80**
100	3 7/8	3 5/8	5/8	3/4	10 1/2	3/4	1/4	.85	.04	**100**
B 5	1		5/32	1/4	5 1/2	1/4	1/4	.30	.01	**B 5**
7	1 1/8	15/16	1/8	7/16	6 1/2	1/4	1/4	.25	.02	**7**
10	1 1/4	1 1/8	5/32	5/16	6 1/2	5/16	5/16	.30	.01	**10**
12	1 9/16	1 1/4	1/4	9/16	7 1/2	3/8	1/4	.35	.02	**12**
***15**	1 3/4		3/16	7/16	7 1/2	3/8	1/4	.30	.02	***15**
B 17	1 15/16	1 11/16	1/8	1/2	7 1/2	3/8	1/16	.30	.02	**B 17**
19	2 1/8	1 3/4	1/4	9/16	8 1/2	9/16	5/32	.40	.03	**19**
20	2 3/16	1 3/4	3/8	1/2	8 1/2	9/16	11/16	.40	.02	**20**
25	2 1/4	1 3/4	1/4	1/2	8 1/2	15/32	7/32	.40	.02	**25**
30	2 1/2	2 1/16	5/16	9/16	8 1/2	1/2	11/16	.40	.02	**30**
B 40	2 3/4	2 3/16	7/16	5/8	9	11/16	15/16	.60	.03	**B 40**
41	2 3/4	2 3/8	3/8	9/16	9	5/8	5/8	.60	.02	**41**
60	2 15/16	2 1/2	3/8	3/4	9 1/2	5/8	1	.60	.03	**60**
***80**	3	2 7/16	13/32	11/16	9 1/2	9/16	1	.60	.03	***80**
90	3 1/8	2 1/2	7/16	5/8	9 1/2	1/2	5/8	.70	.03	**90**

*Heads slightly recessed on stem side. Continued on following page.

VALVE STEM FORGINGS

Unfinished and Weldless

See cuts on previous page. Dimensions show sizes of unfinished forgings.

Send for Blue Prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Type and Number	Head			Stem		Lug on Head		PRICE	For Extra Length per inch or less	Type and Number
	Large Diam.	Small Diam.	Thickness	Diam.	Length	Diam.	Length			
B100	3 5/8	3 1/16	3/8	13/16	10 1/2	11/16	15/16	$.80	$.04	B100
120	4 3/4	4 1/8	7/16	7/8	13	13/16	15/16	1.10	.05	120
140	7	6 1/4	13/16	1 7/16	19	1	1	3.50	.09	140
C 10	7/8		1/8	1/4	5 1/2			.25	.01	C 10
15	1 5/16		3/16	1/4	5 1/2	1/4	1/4	.25	.01	15
20	1 1/2		1/8	5/16	6 1/2	1/4	3/16	.25	.01	20
40	1 13/16		9/32	3/8	7 1/2	5/16	5/16	.35	.01	40
45	2 1/4		1/4	11/16	8 1/2			.45	.03	45
C 48	2 5/8		3/8	9/16	9	3/4	3/32	.45	.02	C 48
50	2 3/4		3/8	3/4	9	3/4	7/32	.55	.04	50
55	2 3/4		3/8	1 3/16	9			.80	.07	55
60	2 15/16		7/16	7/8	9	7/8	1/4	.65	.05	60
62	3		1/2	1	9 1/2	7/8	1/4	.90	.06	62
C 65	3 3/16		3/8	15/16	9 1/2			.80	.05	C 65
70	3 3/8		7/16	1 1/8	9 1/2	1 1/4	5/8	.85	.07	70
75	3 3/8		7/16	1	9 1/2	7/8	5/16	.85	.06	75
77	3 1/2		7/16	1 3/16	9 1/2			.90	.07	77
80	3 9/16		9/16	1 1/8	10 1/2			1.00	.07	80
C100	4 1/16		1/2	7/8	10 1/2			.90	.05	C100
110	4 1/16		5/8	7/8	10 1/2	1 7/8	1/4	1.20	.05	110
120	4 9/16		11/16	1 3/16	13			2.00	.07	120
130	4 7/8		5/8	1 3/8	13	1 7/8	7/16	2.00	.09	130
140	5 9/16		11/16	1 1/2	16	1 7/8	1/2	3.00	.10	140
D 5	1 9/16		3/8	3/8	7 1/2			.30	.01	D 5
7	1 7/8	1 13/16	5/16	7/16	7 1/2			.35	.02	7
20	2 1/4	1 1/16	13/16	11/16	8 1/2			.50	.03	20
30	2 13/16	2 5/16	7/16	7/8	9			.70	.05	30
40	2 15/16	2 3/16	11/16	1	9			.85	.06	40
60	3 5/16	2 3/4	5/8	1	9 1/2			.75	.06	60
E 20	1 3/8	1 1/8	7/32	3/8	6 1/2			.25	.01	E 20
30	1 5/8	1 3/8	1/4	7/16	7 1/2	7/16	3/16	.30	.02	30
35	1 7/8	1 5/8	1/4	7/16	7 1/2	1/2	1/8	.30	.02	35
36	2 1/32	1 3/8	1/4	3/8	8 1/2			.35	.01	36
37	2 1/16	1 3/4	1/4	1/2	8 1/2			.40	.02	37
E 38	2 13/32	2	3/8	1/2	8 1/2			.40	.02	E 38
40	2 11/16	2 1/8	17/32	13/16	9			.60	.04	40
50	2 15/16	2 1/2	7/16	5/8	9			.60	.03	50
60	3 9/16	3	5/8	1 1/16	10 1/2			.90	.06	60
100	5 7/16	4 13/16	11/16	1 5/16	13			1.95	.08	100
F 10	1 13/16	1 5/16	3/8	11/16	7 1/2	5/16	5/8	.40	.03	F 10
20	1 15/16	1 5/8	11/32	7/16	7 1/2	7/16	7/8	.35	.02	20
22	2	1 3/4	3/8	3/4	8 1/2	3/4	2	.45	.04	22
60	2 7/8	2 5/16	7/16	9/16	9	9/16	7/8	.50	.02	60
70	2 7/8	2 1/8	11/16	11/16	9	11/16	1 1/2	.70	.03	70
120	4 11/16	3 5/8	13/16	1	13	1	1 1/2	1.80	.06	120
160	5 5/8	4	3/4	1 1/4	16	1	1 1/2	3.40	.08	160

IGNITER LEVERS

Unfinished



These are regularly furnished from mild steel but can be made from other material in reasonable quantities when required. Special Igniter Levers to order. Dimensions show sizes of unfinished forgings.

Send for Blue Prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

Number	Stem		Arm or Lever			Arm Boss		PRICE	Number
	Diam.	Leng'h under Shoulder	Leng'h from C of Stem	Width	Thickness	Diam.	Leng'h		
4A	5/16	2 1/4	7/8	3/8	3/8	1/2	3/8	$.11	**4A**
4B	5/16	2 3/8	17/32	1/4	7/16			.10	**4B**
4C	5/16	4	1 3/16	1/4	1/4	3/8	5/8	.12	**4C**
5A	11/32	2 5/8	1	7/32	1/4	5/8	3/4	.12	**5A**
5B	11/32	2 9/16	1	9/32	1/4	1/2	1/4	.11	**5B**
6A	†3/8	3 3/4	1 3/8	7/32	7/32	9/16	3/8	.12	**6A**
6B-Right	3/8	4	1 9/32	3/8	5/32	9/16	3/8	.12	**6B-Right**
6C-Left	3/8	4	1 9/32	3/8	5/32	9/16	3/8	.12	**6C-Left**
6D	3/8	4 3/8	1 9/32	15/32	5/16	5/8	9/16	.14	**6D**
6E-Right	3/8	2 1/2	3/4	7/16	5/16	9/16	13/16	.12	**6E-Right**
6F	3/8	2 3/4	31/32	5/16	3/16	9/16	7/32	.11	**6F**
8A	7/16	2 1/2	1	1/2	3/16	9/16	1/2	.12	**8A**
8B	7/16	3 9/16	1 9/16	7/16	7/32	3/4	11/16	.16	**8B**
8C	7/16	3	1 1/4	7/16	5/16	5/8	1 1/4	.16	**8C**
8D	†7/16	4 1/2	2 1/8	3/8	5/16	1	11/16	.25	**8D**
8E	7/16	4 13/16	1 3/16	1/4	5/16	5/8	1/2	.16	**8E**
8F	7/16	3 3/4	1	3/8	1/4	5/8	3/4	.15	**8F**
8G	7/16	3 1/4	1 1/16	3/8	5/16	5/8	5/8	.14	**8G**
8H	7/16	1 7/8	15/16	3/8	5/16	17/32	9/16	.11	**8H**
8I	7/16	4 7/16	1 3/32	1/4	1/4	5/8	1/2	.16	**8I**
8J	7/16	4	1 1/8	13/32	7/32	9/16	1	.16	**8J**
8K	7/16	2 5/16	15/16	1/2	5/16	5/8	1 9/32	.14	**8K**
8L	7/16	2 3/4	1 1/8	3/8	3/16	5/8	23/32	.14	**8L**
8M	7/16	3	15/16	3/8	5/16	3/4	19/32	.14	**8M**
8N	7/16	2 5/8	1 1/16	3/8	5/16	5/8	23/32	.14	**8N**
8P	7/16	3 9/16	1 1/16	3/8	5/16	5/8	5/8	.14	**8P**
9A	15/32	3	2 1/2	7/16	7/16	11/16	3/4	.25	**9A**
***10A**	1/2	4 1/2	1 11/32	5/16	5/16	3/4	15/32	.31	***10A**
10B	1/2	6 3/4	1 1/4	7/16	3/8	3/4	11/16	.22	**10B**
10C	1/2	2 9/16	1 3/32	5/16	5/16	5/8	5/8	.14	**10C**
10D	1/2	4 13/32	1 1/4	15/32	5/16	3/4	11/16	.18	**10D**
12A-Right	9/16	3 9/16	1 3/16	3/8	3/16	3/4	11/16	.18	**12A-Right**
12B-Left	9/16	3 9/16	1 3/16	3/8	3/16	3/4	11/16	.18	**12B-Left**
14A	5/8	1 1/8	1 5/16	3/4	3/8	7/8	1 7/16	.18	**14A**

*Double arms projecting both sides of stem in form of T. †Stem varies in diameter.

LEVERS

Unfinished



These are serviceable as Rock Shafts, Shifting Levers, Milling Machine and Vise Cranks and Automobile Steering Gear and Starting Levers.

Several other styles of various sizes and forms can be supplied from available dies; details on application.

Special Levers to order.

Dimensions show sizes of unfinished forgings.

Send for Blue Prints before ordering as designs are not uniform; we cannot accept responsibility otherwise

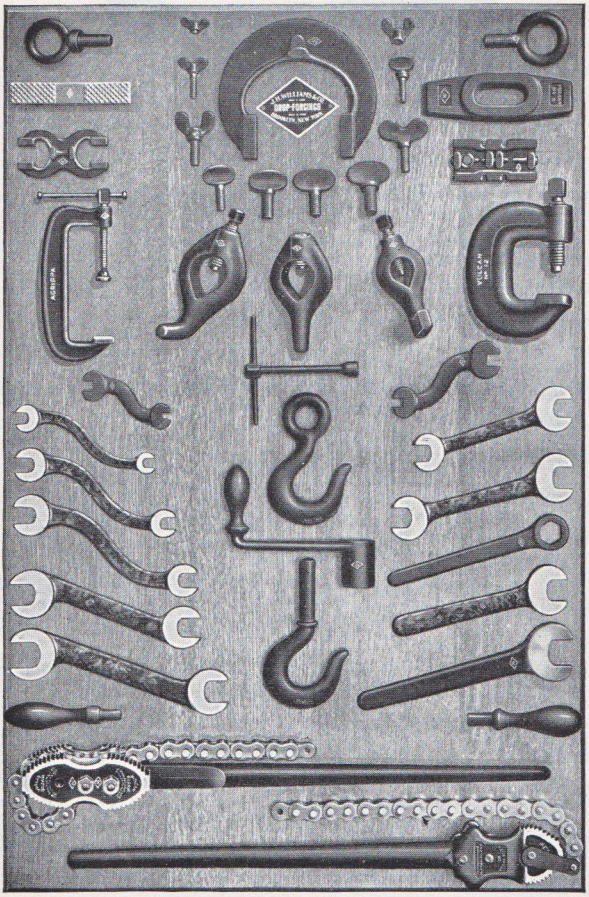
Number	Length C. to C.	Small Hub		Large Hub		Shank		PRICE	Number
		Diam.	Length	Diam.	Length	Thickness	Average Width		
40	**4**	11/16	5/16	1	1 3/8	5/16	27/32	$.23	**40**
40A	**4**	1	19/32	1 1/4	1 1/8	1/2	1	.27	**40A**
45	**4 1/2**	15/16	1/2	1 3/16	1 1/2	3/8	11/16	.30	**45**
50	**5**	3/4	7/16	7/8	1 5/16	5/16	13/16	.25	**50**
50A	**5**	7/8	5/8	1 5/8	1 1/2	1/2	1	.34	**50A**
55	**5 1/2**	1 1/8	5/8	1 1/2	2	17/32	13/16	.50	**55**
60	**6**	7/8	3/8	1	1 1/2	1/4	15/16	.27	**60**
60A	**6**	1	5/16	1 1/4	1 11/16	5/16	15/16	.40	**60A**
60B	**6**	1 1/16	1/2	1 3/8	1 5/16	5/16	1 1/8	.37	**60B**
60C	**6**	1	1/2	1 3/16	1 1/2	3/8	13/16	.37	**60C**
60D	**6**	15/16	5/8	1 1/2	1 1/4	1/2	1	.40	**60D**
66	**6 11/16**	1 1/8	3/4	1 3/4	1	1	1	.50	**66**
70	**7**	1 1/8	5/8	1 1/2	2	1/2	7/8	.50	**70**
79	**7 7/8**	7/8	1/2	1 3/4	2 9/16	5/16	1	.60	**79**
85	**8 1/2**	1 3/8	9/16	1 3/4	2	1/2	1 1/8	.70	**85**
87	**8 3/4**	7/8	3/4	*1 5/16	1 1/16	7/16	1	.38	**87**

*Has clamping boss

DEALERS' SAMPLE BOARDS

As an attractive means of increasing the interest in and sales of drop-forgings, we offer to mount on highly polished, quartered oak boards (charging for merchandise only) such forgings as the dealer may select. Boards in stock are 24x36 and 30x52 in size.

The net price of general selection as shown is about $12.00.



"VULCAN" CHAIN PIPE TOOLS RACK

A commendable method of display for Chain Pipe Tools. Its use will make the usual dark-corner storage space unnecessary and will also increase the interest of both buyer and seller in this stock. The rack is made of wrought iron pipe aluminum painted and occupies an area of about 2x4 ft. It will be loaned only to the dealers in and for use with "Vulcan" Chain Pipe Wrenches, "Agrippa" Fittings Wrenches, "Vulcan" Chain Pipe Vises.



SPECIAL DROP-FORGINGS MADE FOR

Aeroplanes,
Adding Machines,
Automobiles,
Bicycles,
Bolt Cutters
Carpenters' Tools,
Chucks,
Conductors' Punches
Cooking Ranges,
Dairy Machinery,
Elevators,
Fire Arms,
Gas Engines,
Golf Irons,
Hydrants,
Injectors,
Jewelers' Tools,
Knitting Machinery,
Laundry Machinery,
Lawn Mowers,
Locomotives,
Lubricators,
Machine Tools,
Machinists' Tools,
Nail Pullers,
Oil Well Apparatus,
Ordnance,
Projectiles,
Ratchet Drills,
Sewing Machines,
Shoe Machinery,
Special Nuts,
Steam Pumps,
Sugar Machinery,
Tobacco Machinery,
Typewriters,
Water Motors,
Adjustable and Solid Wrenches,
Agricultural Machinery,
Air Compressors,
Automatic Sprinklers,
Boilermakers' and Blacksmiths' Tools,
Bookbinders' Machinery,
Bottling and Wiring Machinery,
Cable Transmission Machinery,
Chain Links and Hooks,
Cotton, Flax, Jute and Wool Machinery,
Dynamos, Electric Motors and Apparatus,
Harness and Saddlery,
Gymnasium Apparatus
Hemp and Wire Rope Machinery and Appliances,
Hydraulic and Lever Jacks,
Ice Cutting Machinery,
Lumbermen's Tools and Appliances,
Marine Specialties,
Pipe Cutting and Threading Machinery,
Pipe Wrenches, Cutters and Vises,
Printing Presses and Printers' Tools
Railway Brakes, Tools and Appliances,
Refrigerating Machinery,
Rock Drills and Mining Machinery,
Saw Mill Machinery,
Steam and Hot Air Engines,
Steam and Hot Air Pumps,
Stonecutters' Machinery and Tools,
Store Service and Cash Registry Machinery,
Surgical Instruments,
Tap Wrenches and Dies,
Telephone and Telegraph Appliances,
Trolley and Cable Railway Fittings,
Weighing Machines,
Wood-working Machinery, etc.

Forgings from Tobin Bronze, Copper and Aluminum

SPECIAL DROP-FORGINGS

THE art of forging with drop-hammers, which may be designated as "machine blacksmithing," developed about 1853, when Col. Samuel Colt adopted these machines to make parts for fire-arms. They have since been greatly improved and the products of the drop-forging industry are now used in a great variety of mechanical arts, some of which we outline on page 118.

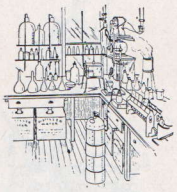


Sinking the Die

PROCESS

Drop-forgings are made in dies which are in two parts. One part is fastened in the ram or hammer itself, which moves vertically between two uprights or guides, the other part is fixed in the anvil or base of the hammer. The ram rises until released, when it descends, striking with the upper die the heated bar of metal placed on the bottom die and forcing it into impressions in both dies. By a series of such blows the completed article is formed. Since 1883 we have given our exclusive attention to the making of a superior grade of this product, known generally as **"drop-forgings."**

Our forging department consists of Board Drops, Steam Drops, Steam Hammers, Trip Hammers, Upsetting Machines, Electric Welding Machines and other apparatus, forming a complete plant.



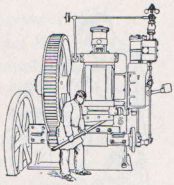
Corner of Laboratory

DIES

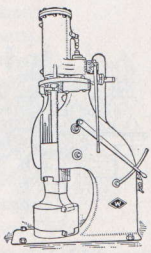
The necessary dies are made to conform to a drawing or model, preferably the latter, as it facilitates designing the dies. We must know whether drawing or model shows finished or forging size; if finished size we need also to know the allow-



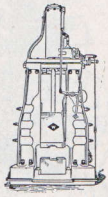
Forge Steel Rack



Steam Shears



Steam Hammer



Steam Drop Hammer

ance desired in machining. It is usual to add at least 1/32 inch on each surface to be machined unless the piece is small and is to be finished by grinding or polishing only, in which case 1/100 inch is allowed; surfaces not to be machined or ground are made close to size. Forgings vary slightly in thickness—say from 1/100 inch to 1/32 inch—depending on their shape and the material used. They can, however, be made to gauge by a restriking operation; this often requires separate dies and entails additional expense. In addition to forging dies, the cost and endurance of which vary with the work required of them, trimming dies are necessary to remove the surplus metal thrown out between the forging dies in working.

We include but a portion of the cost of tools in our estimates and cannot sell them at the price given in our quotations, which cover only the exclusive use of the dies.

We assume all responsibility of breakage, insurance and maintenance, keeping the tools ready for our customer's service and guaranteeing him against all further expense so long as the design remains unaltered. We will not produce forgings from them for others without his written consent.

We prefer not to sell dies at all, because the designing of them involves our best skill which we do not care to make generally available. **Nor is it advantageous to the customer to own the dies,** for aside from his necessary assumption of all risks and depreciation under such conditions, **his use of them would hardly be satisfactory elsewhere,** in view of the material alterations required before they would conform

to the equipment or methods employed in other shops.

LEAD PROOF

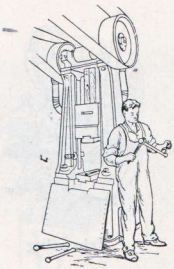
After the impressions have been cut in the die blocks and before the dies are hardened we submit from them for our customer's approval a lead casting, known as a "lead proof."

This cast often varies from the model or drawing by what is called "draft," i.e., the taper necessary on the forgings to permit removing them from the dies while working. It is seldom less than seven degrees and can be obtained by adding to or taking from the forging; unless instructed to the contrary, **we always add the necessary draft.**

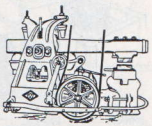
Slight changes can be made when the lead proof is submitted for approval, but after the dies are hardened considerable expense and risk are entailed in effecting alterations. It is of great importance therefore that care be taken to see that the lead proof is correct in every respect before it is approved.

MATERIAL

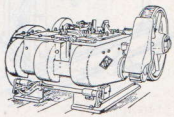
We carry a large and assorted stock of material, but with new dies, where the size of metal required to make the forgings cannot be determined until they are tried in the hammer, delays in obtaining the right sizes sometimes occur. We cannot use poor material, and drop forgings are, therefore, not only superior to hand-forgings or castings, because the metal is improved by the forging operation, but also because the nature of the process requires a better quality of material.



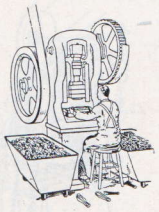
Board Drop Hammer



Trip Hammer



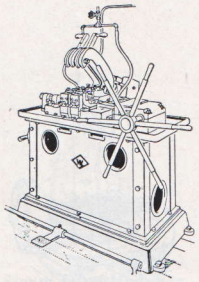
Upsetting Machine



Trimming



Pickling



Electric Welding Machine

We are machining daily many varieties of the products of our own forge and can often determine from this experience what material is best for a customer's use and furnish it in proper condition for his processes. Forgings from high carbon and alloy steels usually require annealing before they can be machined; we have a large and modern equipment for this work as well as for heat-treating and case-hardening. While making forgings we carefully brush them with steel wire brushes to remove the scale, but if they are to be machined we pickle them in diluted sulphuric acid to ensure the complete removal of this hard outer surface. Small pieces we sometimes "tumble."

ELECTRIC WELDING

As a forge-shop auxiliary the Electric-Welding Machine can sometimes be used to advantage instead of the more costly method of "drawing" in a power hammer. For instance, when parts such as Rod and Yoke Ends as shown on pages 90 and 91 are required in lengths longer than we regularly furnish in weldless forgings, we can obtain the excess length desired by electrically welding to the short shank of the standard forging bar steel of a corresponding diameter.

Some irregular shapes which would be impossible to produce satisfactorily in a single piece we drop-forge in two or more parts and then weld in the electric machine. **All our standard stock goods as listed in this catalogue, however, are weldless, as are also all "special" forgings made to order unless we have distinctly stated that they will be "electric-welded."**

INSPECTION

All our product is carefully inspected by men employed only on this work and every precaution is taken to insure none but perfect forgings leaving our plant.



Inspection

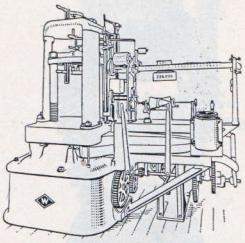
PRICE

We can often save customers expense if informed of the use for which the forgings are intended. The price is largely affected by the quantity made with one setting of the tools. It costs as much to set dies for 100 as for 1000 pieces, and the forging work is also more costly per unit in small lots. **Prices for special drop-forgings are made per piece, not per pound,** and vary with the nature of the work, the material used and the quantity taken at one time.

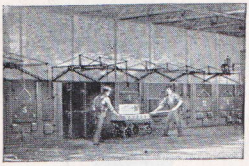
GUARANTEE

We guarantee the quality of both workmanship and material and will credit all special forgings that are imperfect or defective, but **we cannot be responsible for the cost of labor put on them after they have left our hands.**

The cheapest forgings in the long run are those made uniform in size and quality and close to finished dimensions, thus saving labor, time, tools and money.



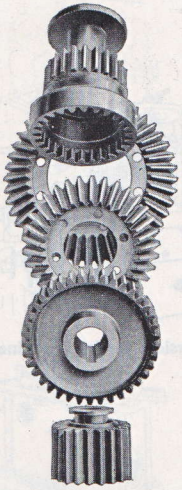
Physical Testing Machine



ANNEALING, CARBONIZING, CASE-HARDENING AND TEMPERING DONE TO ORDER

EQUIPMENT

The demands of our customers and of our own standard product have led to constant improvement in our facilities, so that we are exceptionally well fitted to care for this class of work in a manner that would be impracticable for a smaller volume of business. Our equipment includes a large battery of Annealing and Case-Hardening Furnaces and suitable apparatus for hardening and tempering carbon and alloy steel, including "high speed" steel parts.



Case-hardening of all Classes

PYROMETERS

Until within comparatively recent years annealing and hardening heats were regulated by such skill and judgment as the operator was able to apply unaided by any mechanical means of accurately determining the temperature of the part to be treated. It was and still is impossible to obtain uniform results by such methods and consequently in order perfectly to control the heating of steel, our furnaces are fitted with Pyrometers.

In some cases these are recording instruments so that when desirable a complete record may be preserved for future reference.

ANNEALING

The proper annealing of tool steel bars—particularly the air-hardening or "high speed" variety and other alloy steels—is an operation requiring considerable care and skill. Our

furnaces will accommodate bars in maximum lengths of twelve feet; longer bars **must be cut before delivery** to us.

CARBONIZING

We are prepared to carbonize all parts such as cam shafts, gears, etc., which require this treatment. The wearing portions may then be hardened as desired by reheating and dipping.

CASE-HARDENING

Case-hardening may be classified in two broad, general divisions:

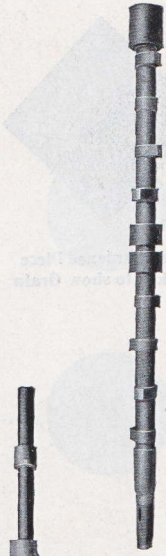
1st. Dipping or cooling direct from the carbonizing heat, and

2d. Reheating the parts after they have been cooled slowly from the carbonizing heat and then dipping or cooling them at this second heat.

The former is usually employed to obtain the attractive mottled effect generally known as "color" hardening, while the latter process leaves the parts of a dull, blackish tint; they are tougher and stronger, however, than parts hardened for "color." Portions only of such pieces can be hardened, if desired.

We are constantly using both methods and our wide experience in case-hardening parts weighing from a few ounces to about one hundred pounds each enables us to care for the special needs of our customers very successfully.

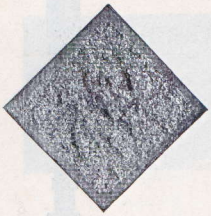
It is our practice to carbonize a small test piece of low carbon steel in the same pot with each lot of case-hardening done to order. This test piece is then hardened, broken to show the grain and sent to the customer. It indicates, approximately, the depth of hardening in that particular job.





Carbonized Cam Shafts

HEAT-TREATMENT



Case-hardened Piece broken to show Grain

Our experience in making crank shafts and other parts which are subjected to severe stress in use has led to the development of various "heat-treatments." These remove such strains as may have developed in the metal during the rolling or forging processes; in addition they stiffen and toughen the part so treated by raising its elastic limit and tensile strength without sacrificing a satisfactory elongation and reduction of area.

This process is modified to suit the material used and the service required of the part. We regularly "heat-treat" many of our stock goods as well as such special forgings as required.

CHEMICAL AND PHYSICAL TESTING LABORATORY



Test for Physical Strength showing Elongation

Our Chemical Laboratory, established in 1900, has grown largely during the past few years. While prepared and fully equipped to make general metallurgical analyses, we employ it almost wholly for the purpose of assuring ourselves that the material used in our stock and special forgings is within the chemical specifications required. This at times means the **separate analysis of each bar in a shipment** of raw material from the mill, and in every case we endeavor to analyze sufficiently to assure ourselves that the steel supplied to fill all orders is of uniform character and well within the desired chemical limits.

All samples sent to us for special analysis are kept for three months, whereupon they are discarded unless other arrangements have been made.

There is, of course, a more or less exact proportionate relationship between the chemical analysis of any steel and its physical strength. Since 1889 we have been regularly testing our product on standard machines and our Physical Laboratory is constantly employed in making such tests as our experience has taught us to regard as valuable. In fact, some of our standard stock lines, such as Eye Bolts, Hoist Hooks, Chains for "Vulcan" and "Agrippa" Chain Wrenches and "Vulcan" Vises, etc., as shown in this catalogue are regularly "proof-tested" to a predetermined proportion of their ultimate strength, as stated in lists.

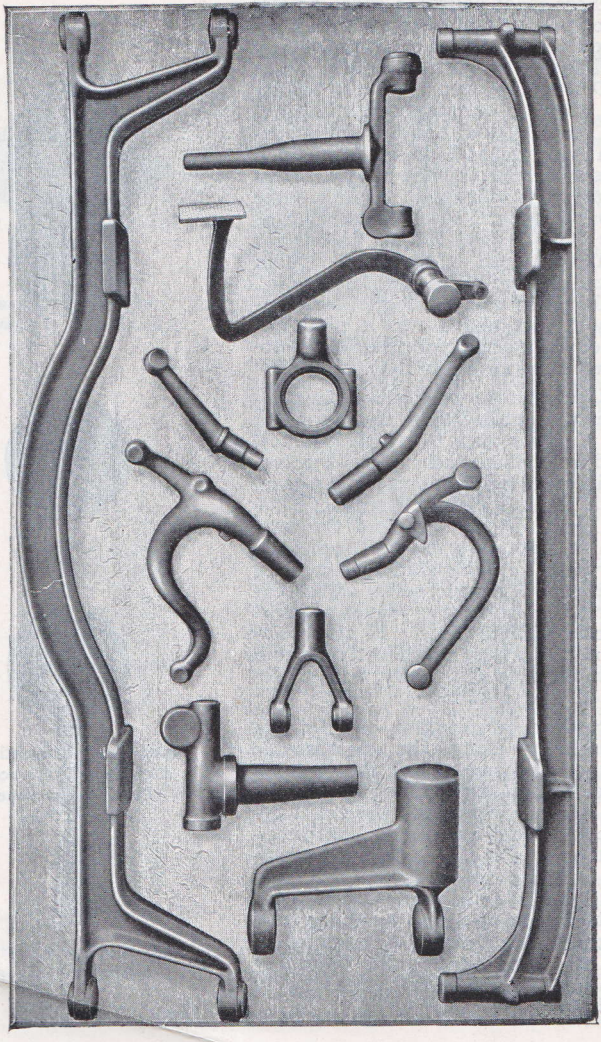
Naturally, the work which any forging is to be called upon to do governs the physical tests to which the steel used in its manufacture is subjected. While for ordinary purposes the usual static tests (Ultimate Strength, Elastic Limit, Elongation and Contraction of Area) are deemed sufficient, there are cases in which the making of certain dynamic tests, as for example the vibratory, proves of great practical importance. In this manner material which is defective, either chemically or physically, can be detected and avoided.

Further information can be obtained by using the microscopic method of examination; this is sometimes found very valuable. By its use it is possible to tell the exact degree our heat-treatment has developed each of the so-called microscopical constituents of steel. Taking this knowledge in conjunction with that already obtained by the several examinations previously described, we can determine quite definitely the physical results to be reasonably expected.

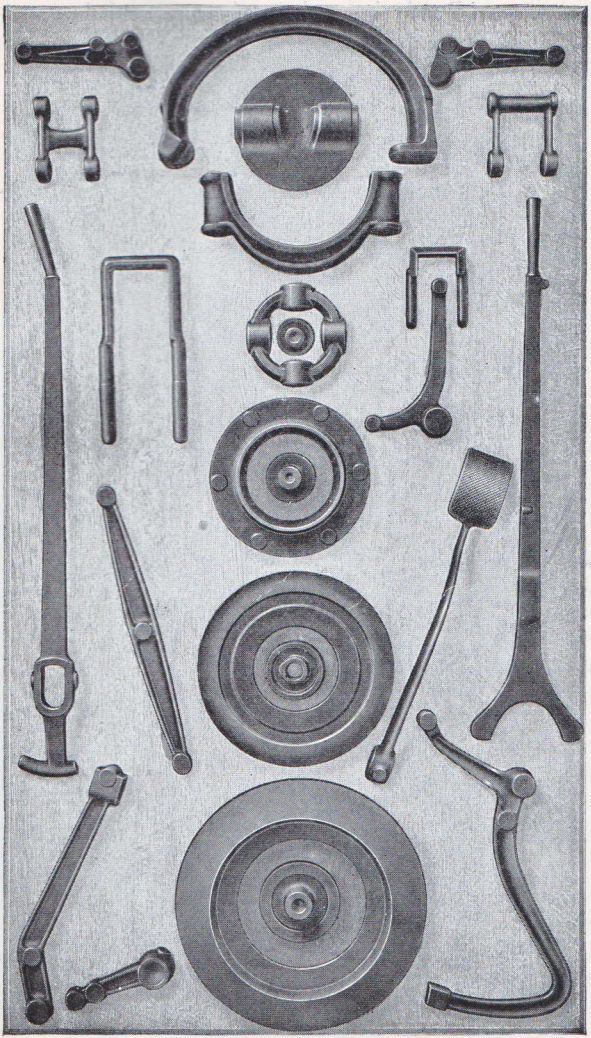


Micro-Photos illustrating Structural Differences Developed in same Piece of Steel

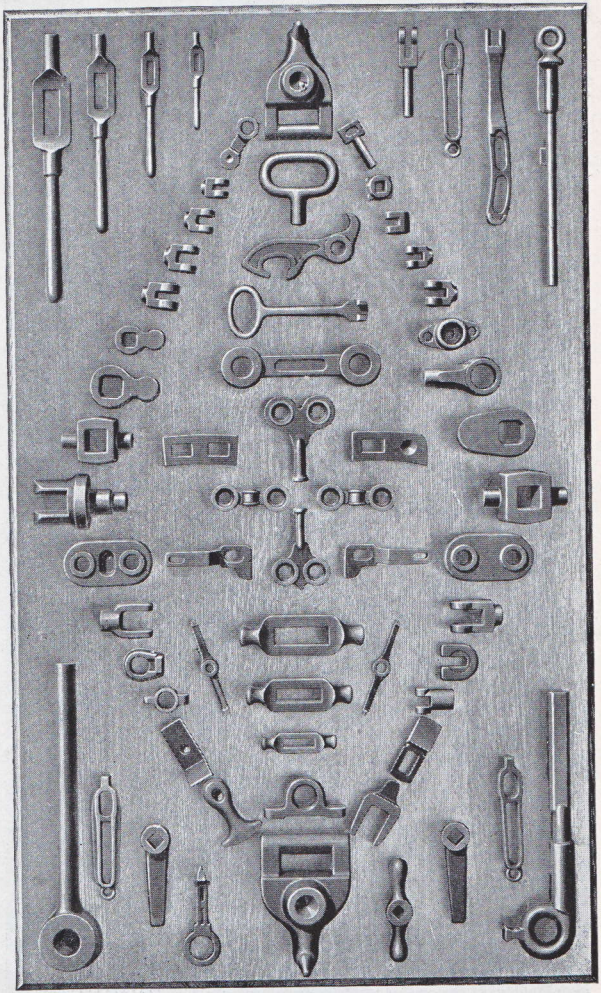
Illustrations of Drop-forgings made to order; not for sale from stock



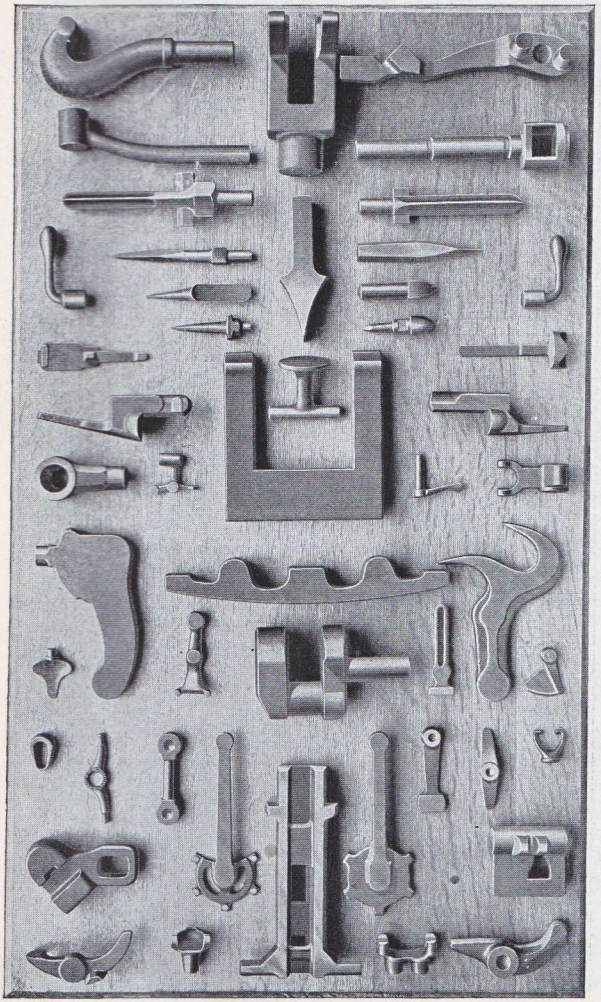
Illustrations of Drop-forgings made to order; not for sale from stock



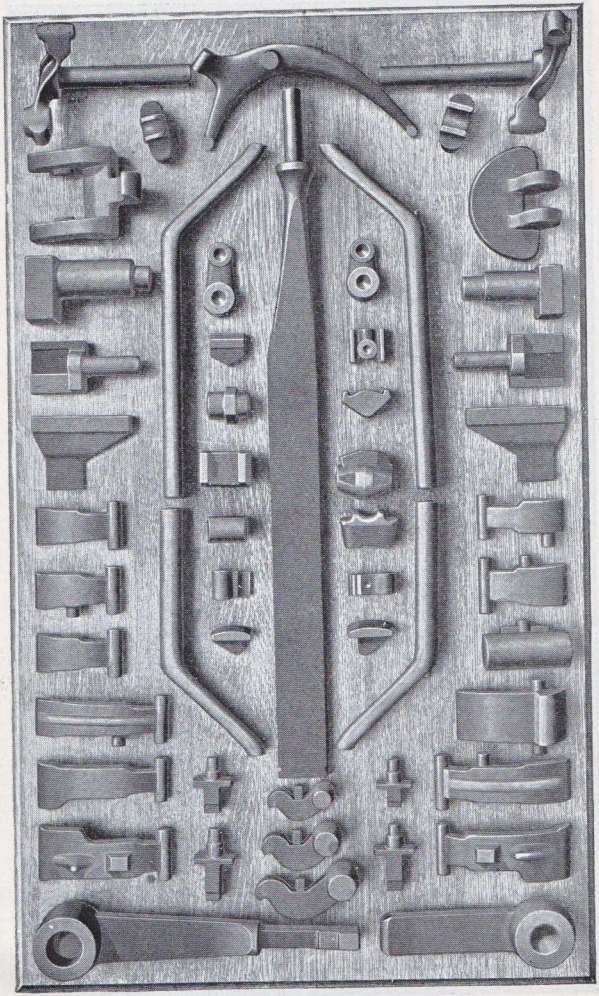
Illustrations of Drop=forgings made to order; not for sale from stock



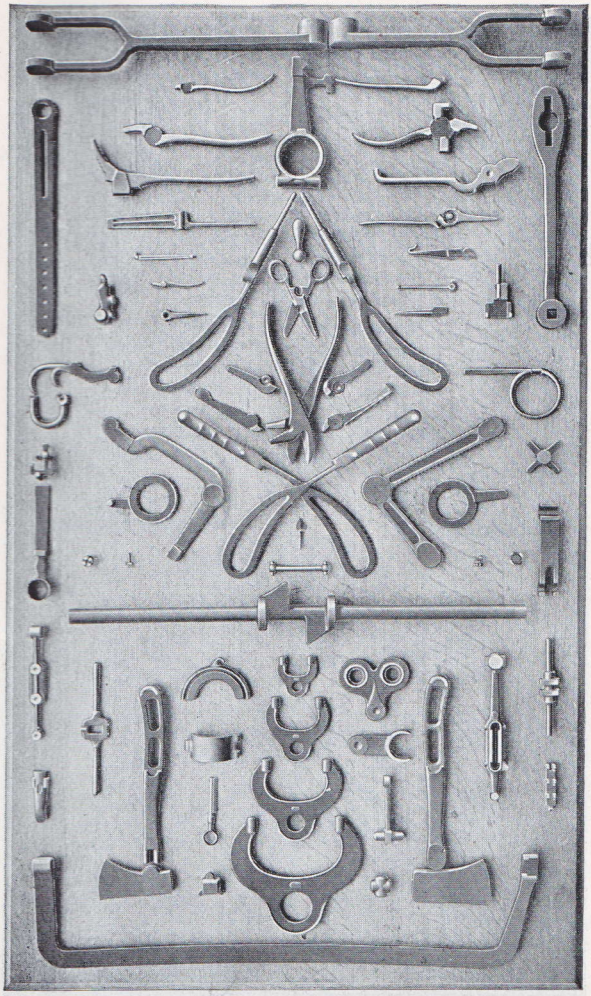
Illustrations of Drop-forgings made to order; not for sale from stock



Illustrations of Drop-forgings made to order; not for sale from stock



Illustrations of Drop-forgings made to order; not for sale from stock



Illustrations of Drop-forgings made to order; not for sale from stock

